

# State of California

## MP SERIES™ Battery Backup System

### for Traffic Signals

### MP2000E System



## Volume Two: Electrical / Mechanical Drawings

MP SERIES™ Battery Backup System for Traffic Signals  
MP2000E System  
Revision 5.0  
Serial Numbers: MC18E16553 to present

## IMPORTANT

**EMERGENCY SHUTDOWN PROCEDURE IS ON INSIDE OF REAR COVER**

For service, parts, or technical support contact Myers Emergency Power Systems at

TEL: (610) 868-3500

FAX: (610) 868-8686

[www.myerseps.com](http://www.myerseps.com)

Or scan here

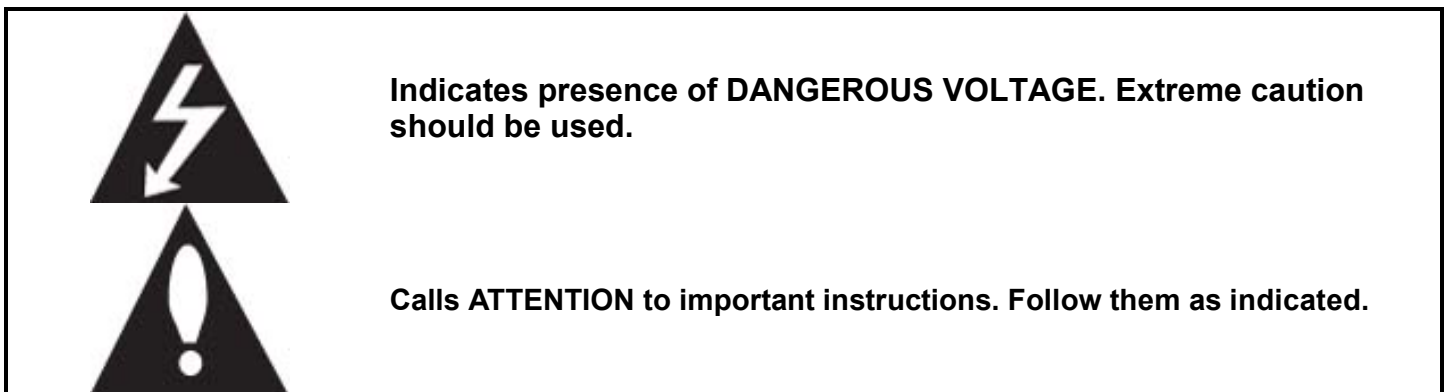


**SAVE THESE INSTRUCTIONS**

## IMPORTANT SAFETY INSTRUCTIONS ARE CONTAINED IN THIS MANUAL



To reduce the risk of electrical shock and to ensure the safe operation of the MP2000E, the important safety instructions are marked with the symbols shown below. These symbols are used throughout this manual to indicate that the instructions being presented are for procedures that should only be carried out by qualified personnel.



**DANGER:** Do not expose the MP2000E to rain or moisture.



**DANGER:** Total earth ground leakage current of loads connected to the MP2000E should not exceed 2.4 mA.



The MP2000E generates, uses, and can radiate radio frequencies if not installed and tested in accordance with the instructions contained in this manual. It has been tested and found to comply with the limits established for a Class A computing device pursuant to part 15 of FCC rules, when it is operated alone. It also complies with the radio interference regulations of DOC, which are designed to provide a reasonable protection against such interference, when this type of equipment is used in a commercial environment. If there is interference to radio or TV reception, which can be confirmed through switching the MP2000E on and off, relocate the radio or TV equipment or use an electrical circuit other than the one used by the MP2000E.

## IMPORTANT SAFETY PRECAUTIONS

**ONLY QUALIFIED PERSONNEL SHOULD SERVICE OR SUPERVISE THE SERVICE OF THE MP2000E.**




**DANGER:** The MP2000E uses sealed lead-acid batteries with high energy and chemical hazard levels. This manual contains important operation and safety instructions.

<b>MP2000E SYSTEM SAFETY CHECKLIST</b>	
✓	
	<b>Unpack the MP2000E carefully. Report any shipping damage at once.</b>
	<b><i>Read this manual.</i> If you have any questions about safe installation, operations, or maintenance of the system, contact the Emergency Power Systems service department at 610-868-5400.</b>
	<b>Before installation, confirm that the voltage and current requirements of the load(s) are compatible with the system's output. Confirm that the line voltage and current are compatible with the system's input requirements.</b>
	<b>Install the MP2000E on a dedicated power circuit.</b>
	<b>Place a warning label on the enclosure indicating that a Battery Back-Up (BBS) is located inside.</b>
	<b>Use proper lifting techniques when moving the system.</b>
	<b>Be advised that the MP2000E has more than one live circuit. It is fed from AC as well as battery power. Power may be present at the output(s) even if the system is disconnected from line power.</b>
	<b>When installing a system in other than a Myers Emergency Power Systems cabinet, verify that the environment meets the system specifications as presented in Section 3 of this manual.</b>



**SAVE THIS MANUAL**  
*It contains important installation and operating instructions.  
 Keep it in a safe place.*



 <b>BATTERY SAFETY CHECKLIST</b>	
✓	
	<b><i>High &amp; dangerous voltages are present inside the system. Only qualified personnel should perform installation and maintenance.</i></b>
	<b><i>Live battery wires must not touch the MP2000E chassis or any other metal objects. This can cause a fire or explosion.</i></b>
	<b><i>Inspect the batteries once a year for signs of cracks, leaks, or swelling. Replace as needed.</i></b>
	<b><i>When batteries are in storage, charge them at least once every three months for optimal performance and to extend their lifetime.</i></b>
	<b><i>Always replace batteries with the ones of identical type and rating. Never install old or untested batteries. Never mix old with new batteries. Never mix the different amp hour rated batteries within one system.</i></b>
	<b><i>Use insulated tools during servicing.</i></b>
	<b><i>Remove all rings, watches, jewelry, or other conductive items before working inside</i></b>
	<b><i>Follow local regulations for the disposal of batteries. Recycling is the best method.</i></b>
	<b><i>Never burn batteries to dispose of them. Doing so may cause them to explode.</i></b>
	<b><i>Do not open the batteries. The contents are toxic.</i></b>

<b>STANDBY GENERATOR CHECKLIST</b>	
✓	
	<p><b>⚠ Note: If the MP2000E constantly switches between Battery and Line modes because of line fluctuations, the input parameters should be <i>broadened from Normal to Generator</i> (see Section 6.b.2.1 “Sense Type”)</b></p>
	<p><b>In Generator mode, the acceptable range of input frequency and voltage is expanded to accommodate the voltage and frequency fluctuations created by a generator or a power source of such kind.</b></p>
	<p><b>Use a generator with electronic speed and voltage controls which typically produces the Total Harmonic Distortion in % (THD) to be less than 10%. Generators with mechanical governors can force the system to run continuously in Battery mode.</b></p>
	<p><b>Before installation, compare the generator’s output voltage to the MP2000E’s input voltage requirements as listed on both nameplates. To ensure the system’s smooth operation, use a generator capable of supplying 200% or twice as much power as required by the total load.</b></p>


<b>UNPACKING &amp; INSPECTION CHECKLIST</b>	
✓	
	<b>Carefully remove the MP2000E from the box and inspect the contents.</b>
	<b>Verify that the box contains 1 MP2000E BBS System.</b>
	<b>Verify that the box contains 1 temperature sensor probe cable with three-pin connector</b>
	<b>Verify that the box contains 1 Operating Manual</b>
	<b>Verify that the box contains 1 binder of Electrical/Mechanical Drawings</b>
	<b>The Power Transfer Switch (PTS) and all the associated wiring &amp; hardware required for installation are supplied in a separate box.</b>
	<b>The set of four (4) batteries may be shipped separately, if a large quantity of MP Series systems is supplied.</b>

### **SAVE THE ORIGINAL SHIPPING MATERIALS**

When returning the MP2000E for servicing, use the original shipping box and Styrofoam protectors. Myers Emergency Power Systems is not responsible for damage caused by improper packaging of returned systems.

### **READ THE OPERATING MANUAL**

Before installation, become familiar with the MP2000E by reviewing the procedures and drawings in this manual. If you have any questions about safe installation, operation, or maintenance, contact Myers Emergency Power Systems service department at 610-868-5400.

	<p><b>NOTE</b></p> <p><i>If any items are missing or damaged, contact Myers Emergency Power Systems (610-868-3500) and the shipping company immediately. Most shippers have a short claim period.</i></p>
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**COMPLETE THE FORMS BELOW FOR YOUR RECORDS & TO ASSIST WITH SERVICE REQUESTS**

<b>Model Number</b>	<b>MP2000E</b>
<b>Serial Number</b>	<b>MC</b>

The serial number can be found on the nameplate label located on the side of the unit.

<b>Myers Emergency Power Systems Sales Order Number</b>	<b>MP2000E</b>
<b>MP2000E P/N</b>	<b>G30219CA2</b>
<b>Your Purchase Order Number</b>	
<b>Purchased From</b>	



**INSTALLATION LOCATION DETAILS**

<b>Installation Date</b>			
<b>Installed By</b>			
<b>Intersection Street Names</b>			
<b>City</b>			
<b>State/Province</b>		<b>Zip Code</b>	
<b>Telephone Number</b>			
<b>Fax Number</b>			
<b>E-Mail Address</b>			
<b>Cabinet / Controller Type</b>			

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## Volume Two: Electrical/Mechanical Drawings

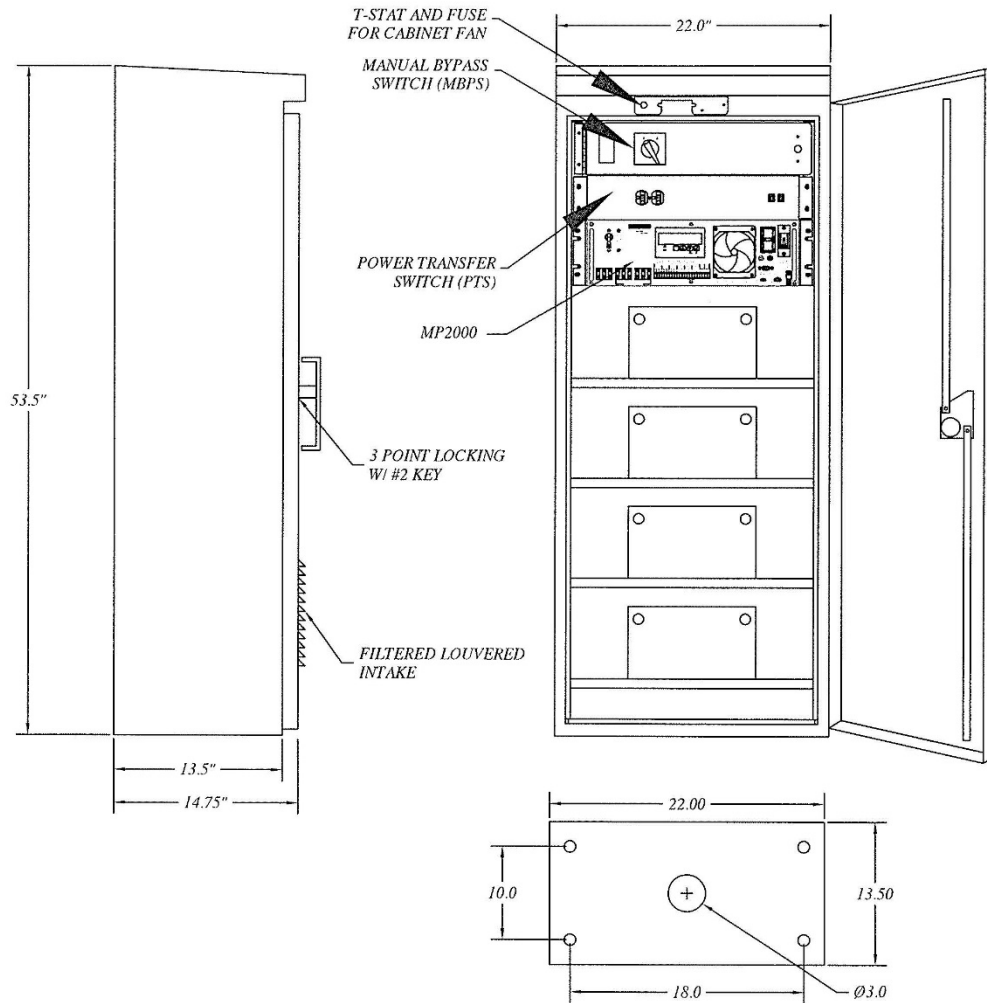
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## **Section 9 Electrical Interconnection Details & Diagrams**

Located behind this page are electrical interconnection detail diagrams and drawings for the Myers Emergency Power Systems MP 2000E System. These images are organized as follows:

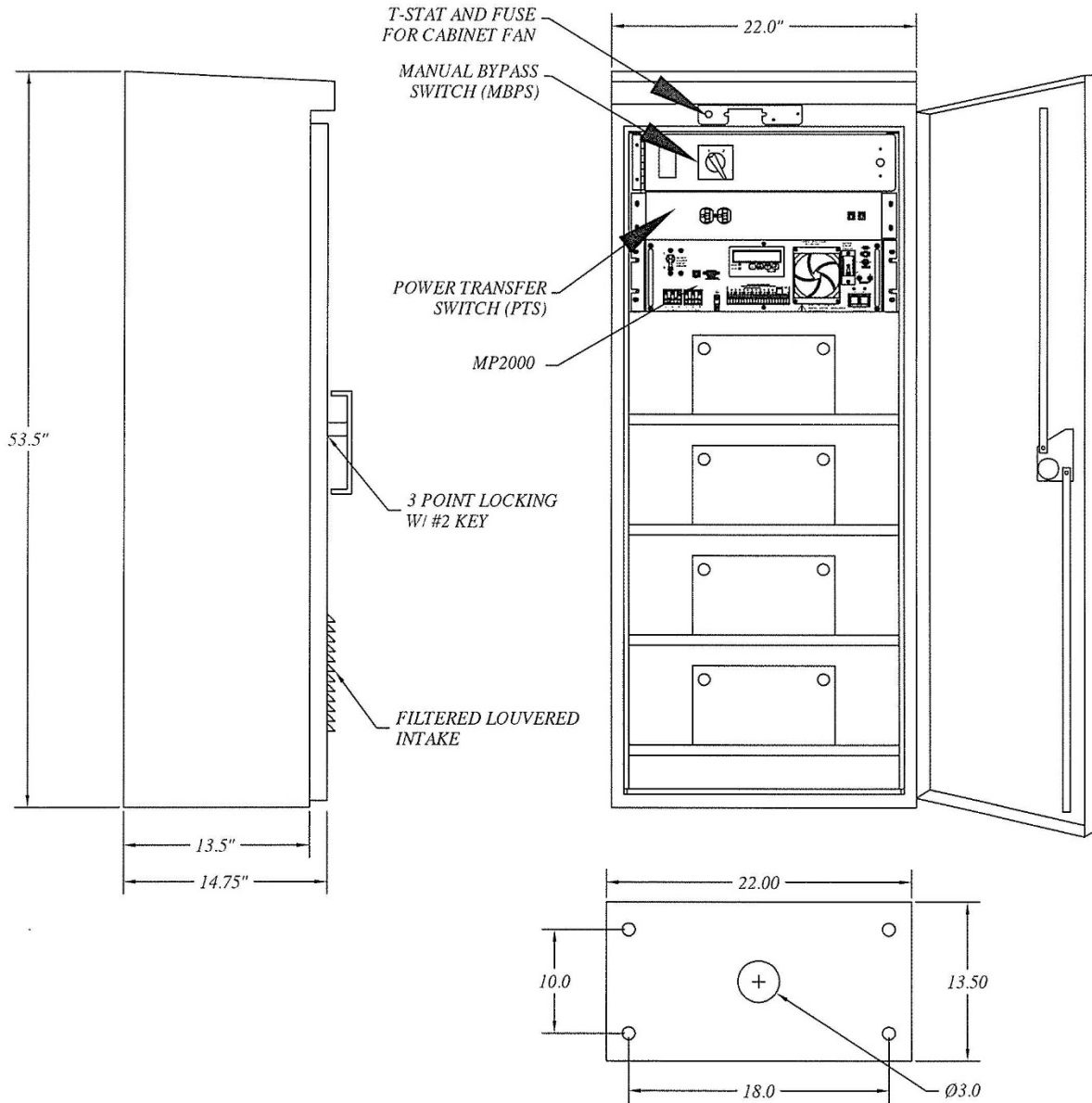
- **MP 2000E Cabinet Drawings**
- **BBS Cabinet System Interconnect Example**
- **MP 2000E System Level Schematic**
- **Wiring Connection Diagram**
- **Simplified MP2000E System Block Diagram**

**Cabinet Level Drawings (Sheet 1 of 3)**  
**MP SERIES™ Battery Backup System for Traffic Signals: MP2000E System**

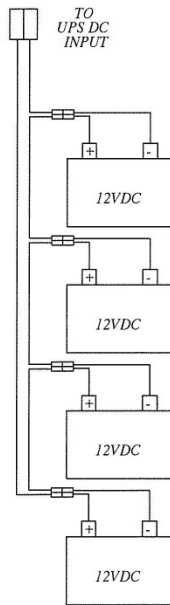
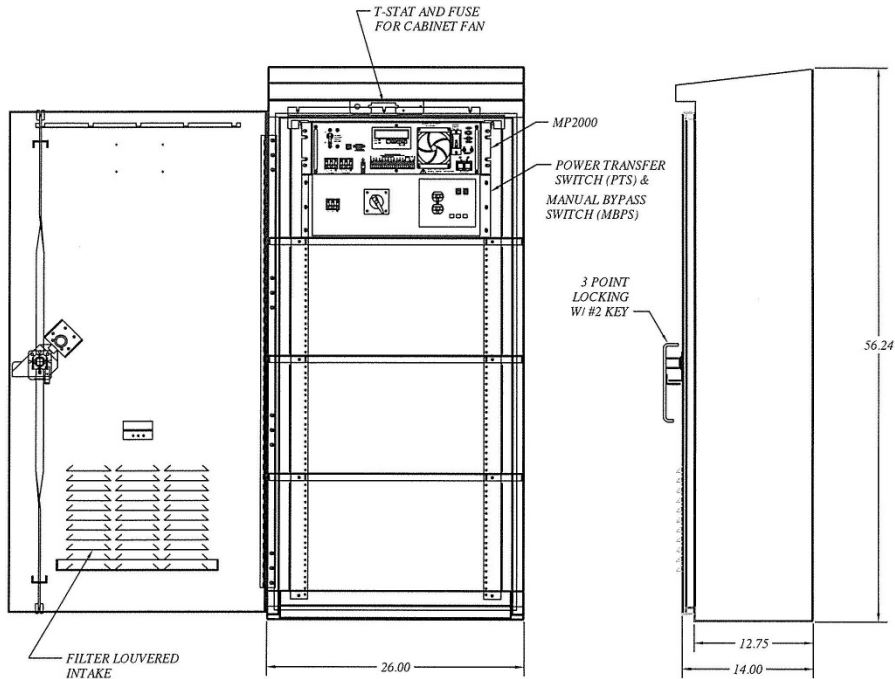




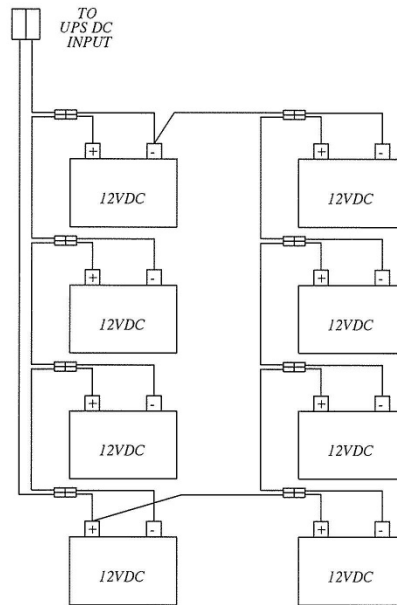
**Cabinet Level Drawings (Sheet 2 of 3)**  
**MP SERIES™ Battery Backup System for Traffic Signals: MP2000E System**



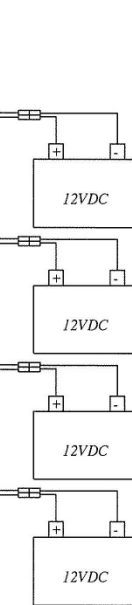
**Cabinet Level Drawings (Sheet 3 of 3)**  
**MP SERIES™ Battery Backup System for Traffic Signals: MP2000E System**



CABLE #: 739561



CABLE #: 739561

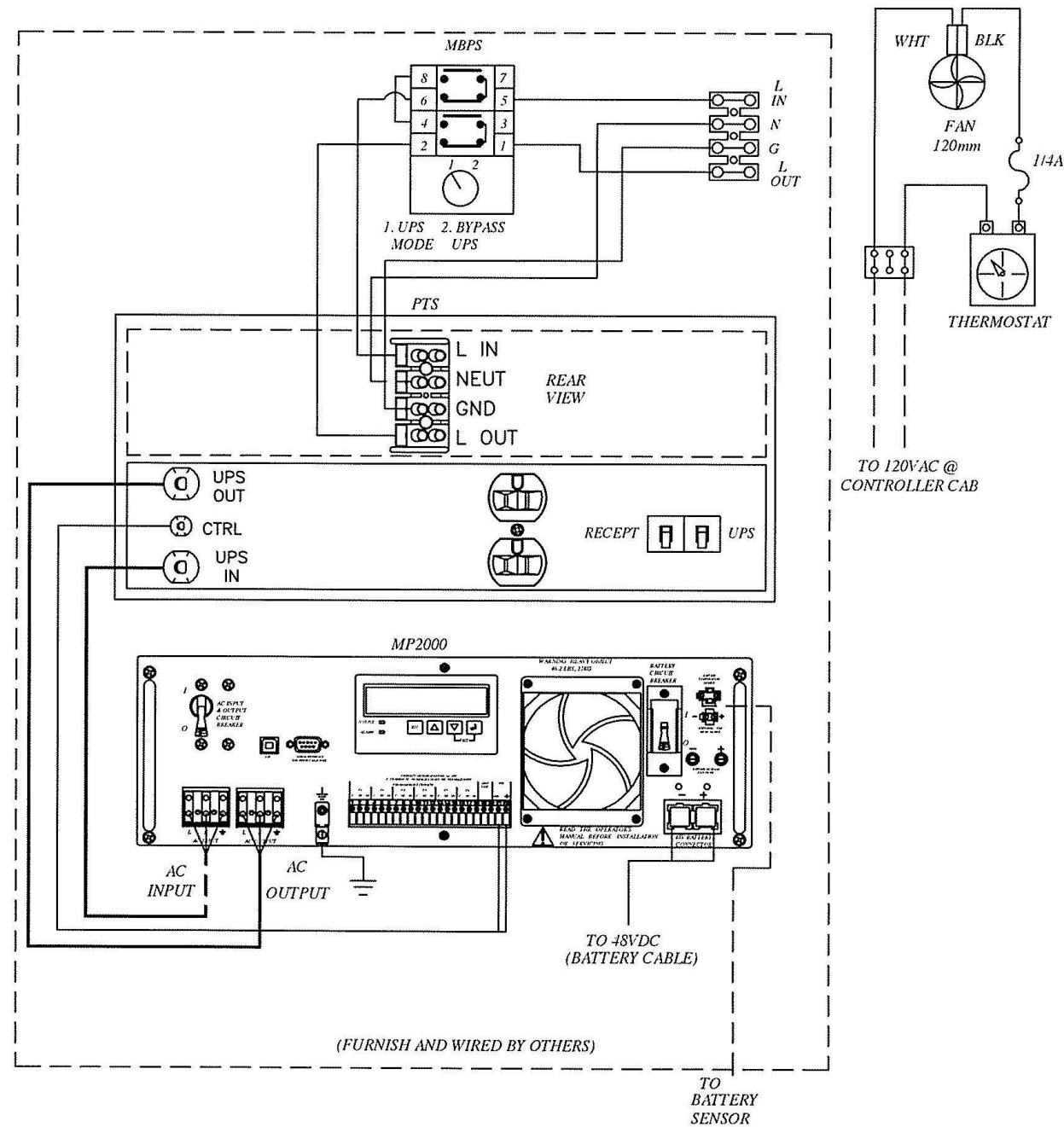
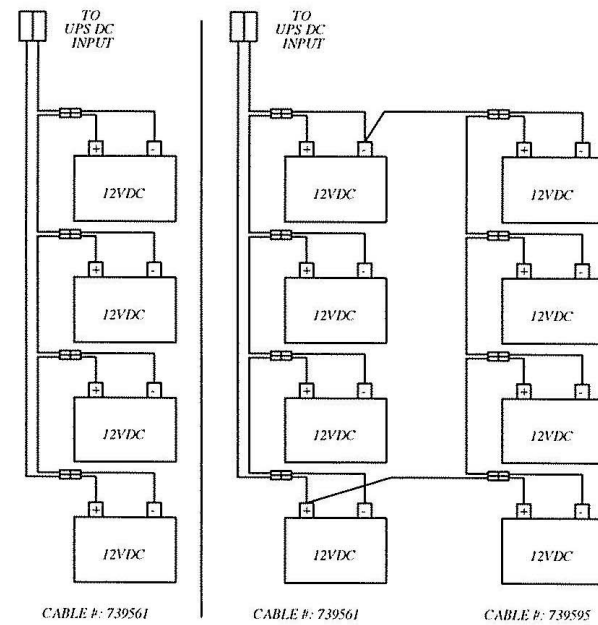
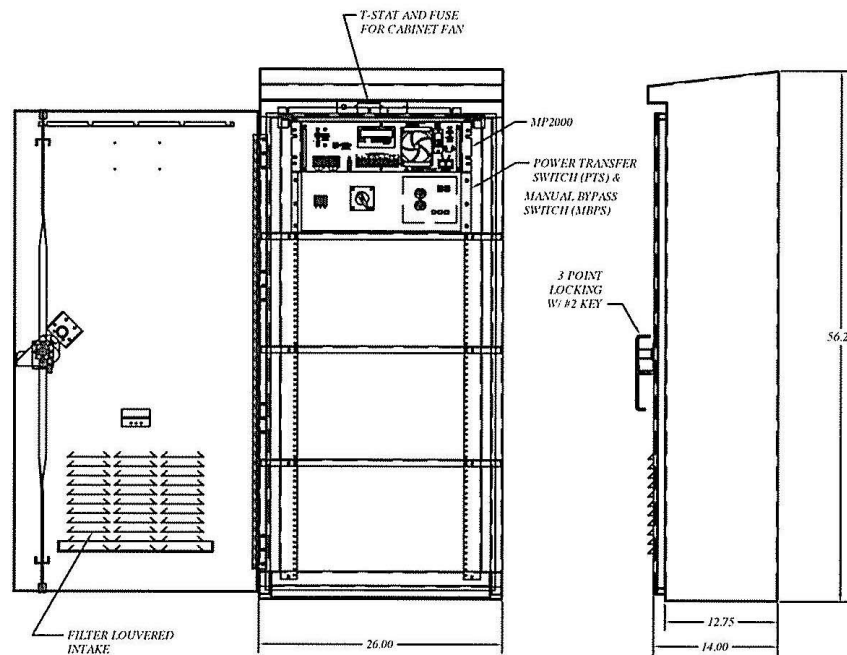


CABLE #: 739595

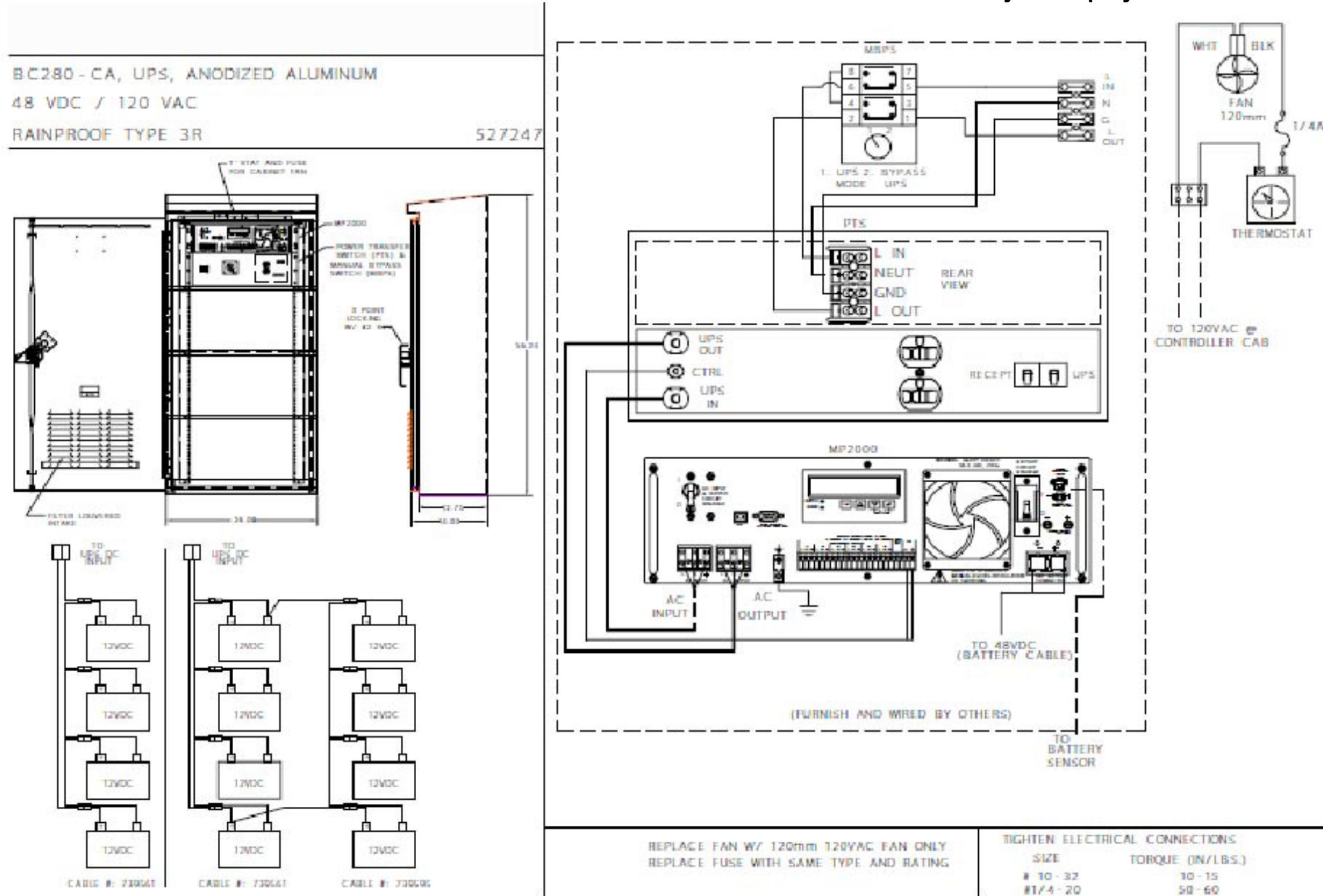
**BBS Cabinet System Interconnect Example**  
**MP SERIES™ Battery Backup System for Traffic Signals: MP2000E System**

BC280-CA, UPS, ANODIZED ALUMINUM  
48 VDC / 120 VAC  
RAINPROOF TYPE 3R

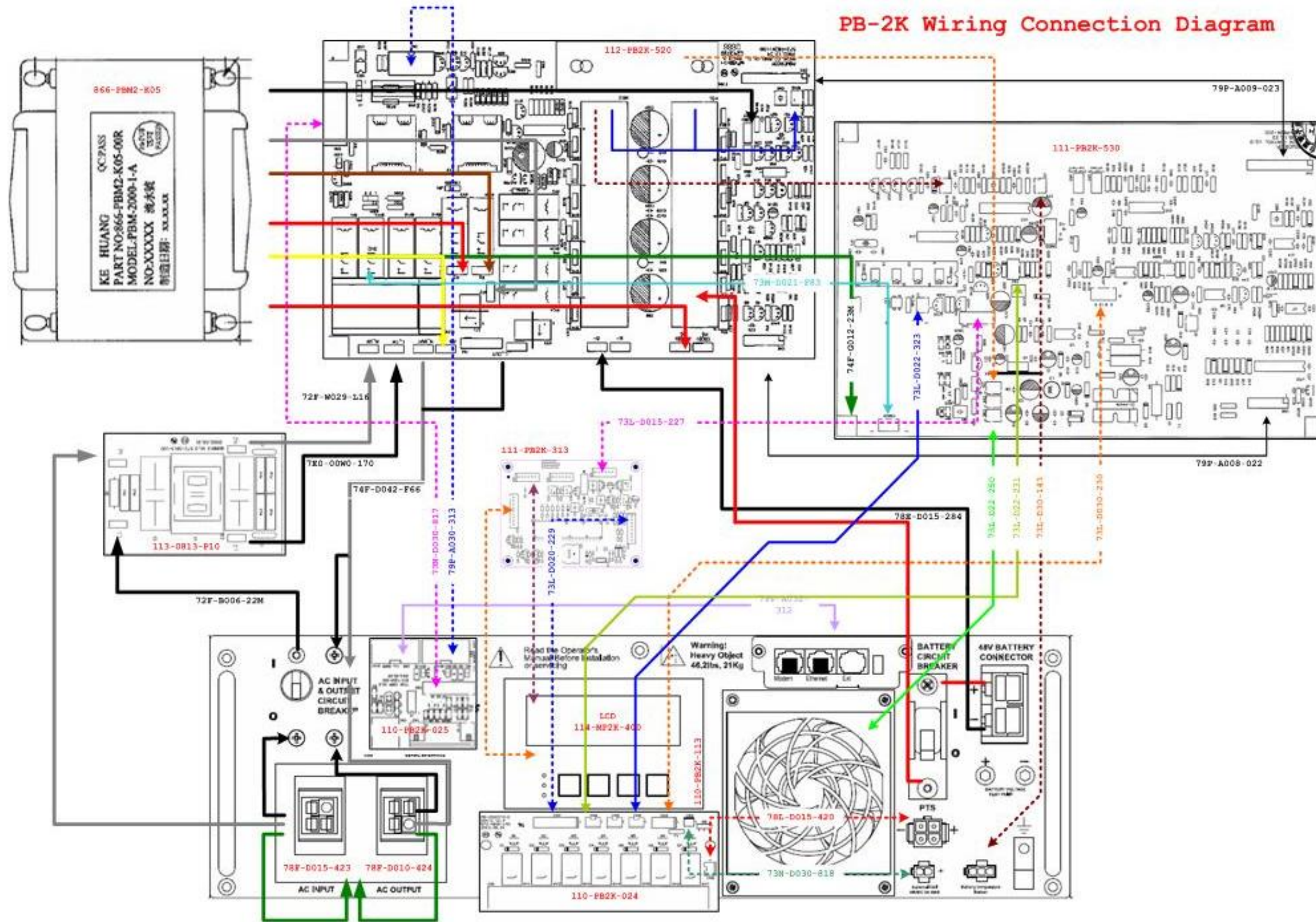
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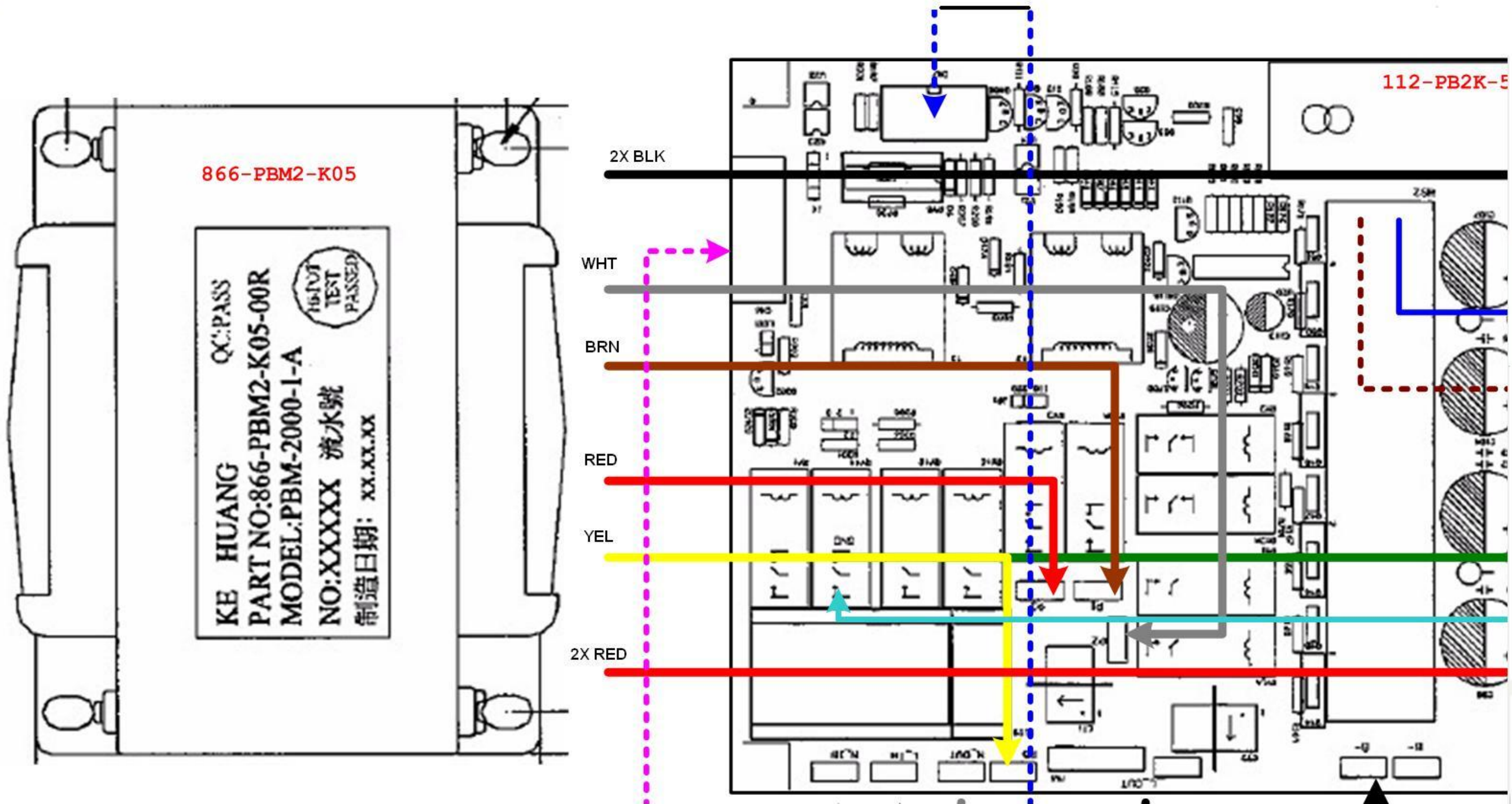
**System Level Schematic**  
**MP SERIES™ Battery Backup System for Traffic Signals: MP2000E System**



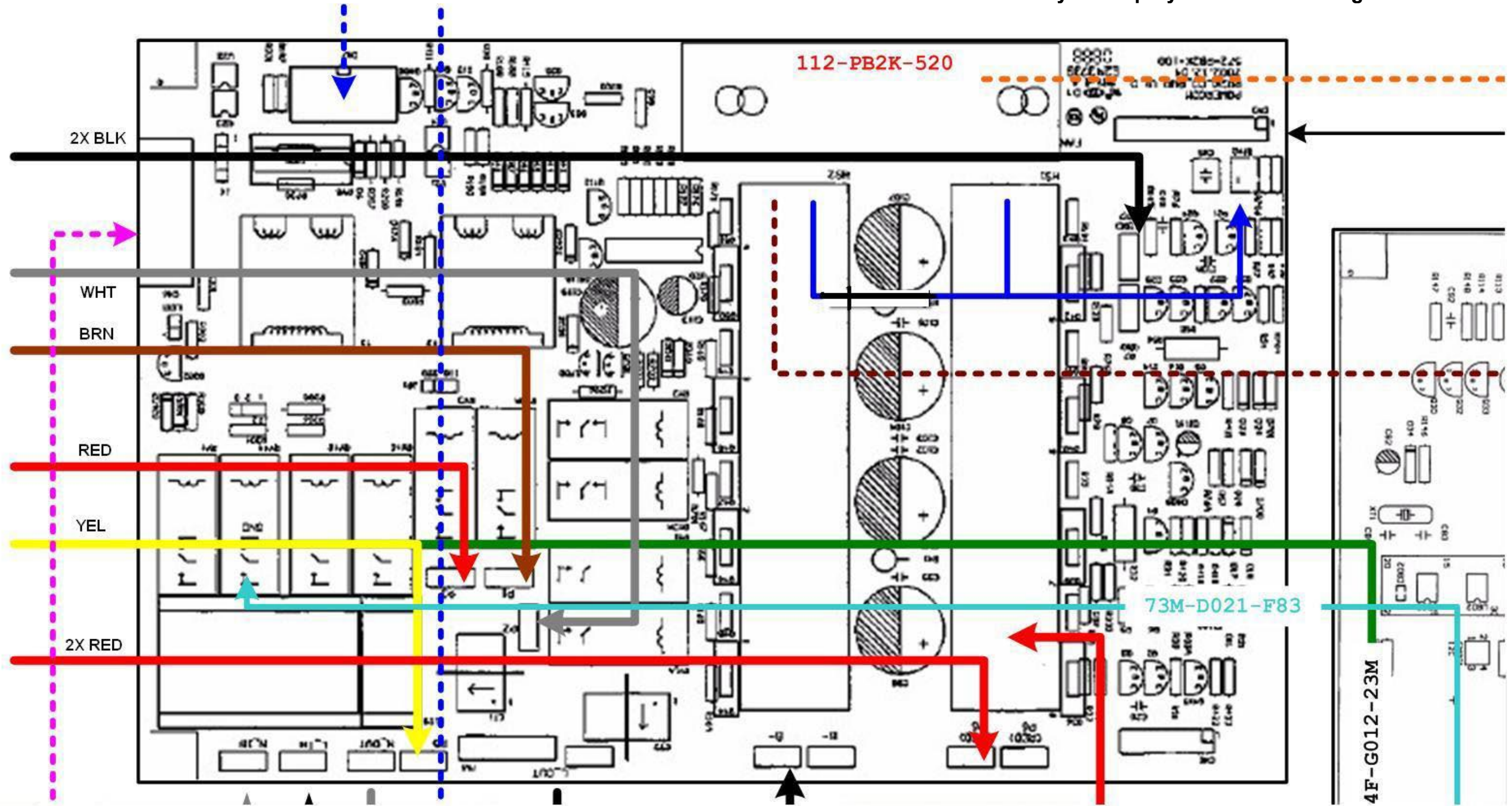




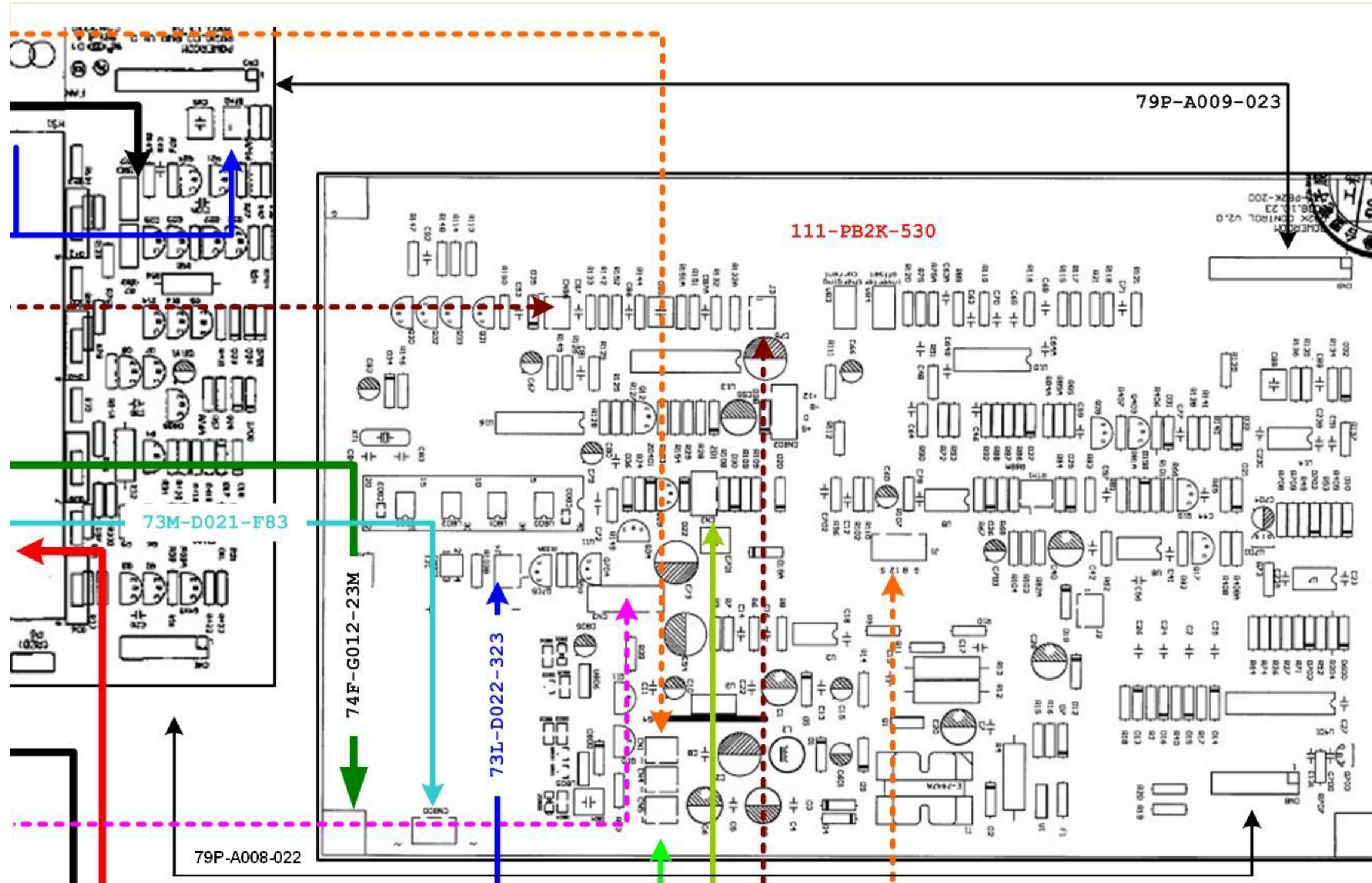




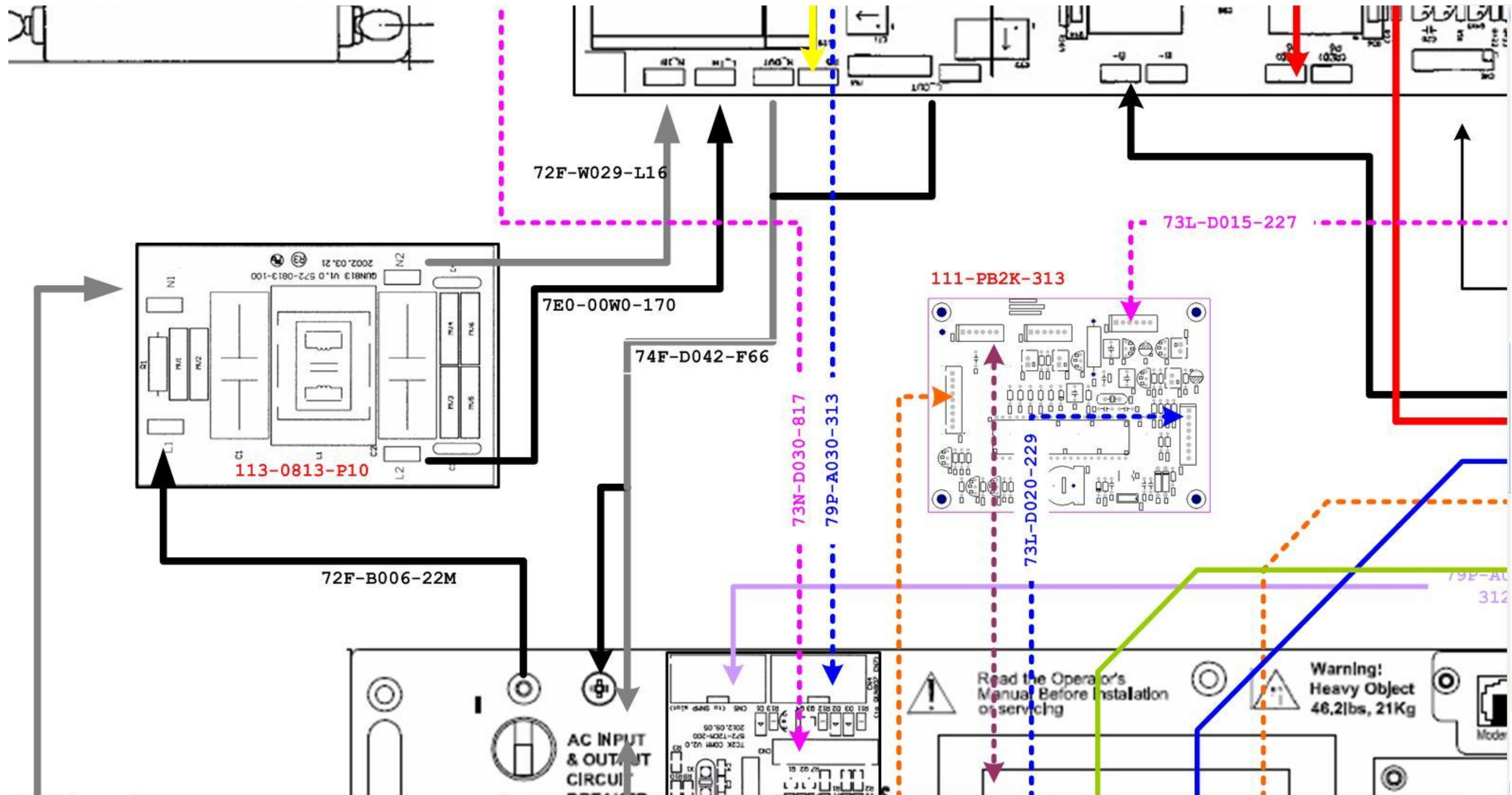


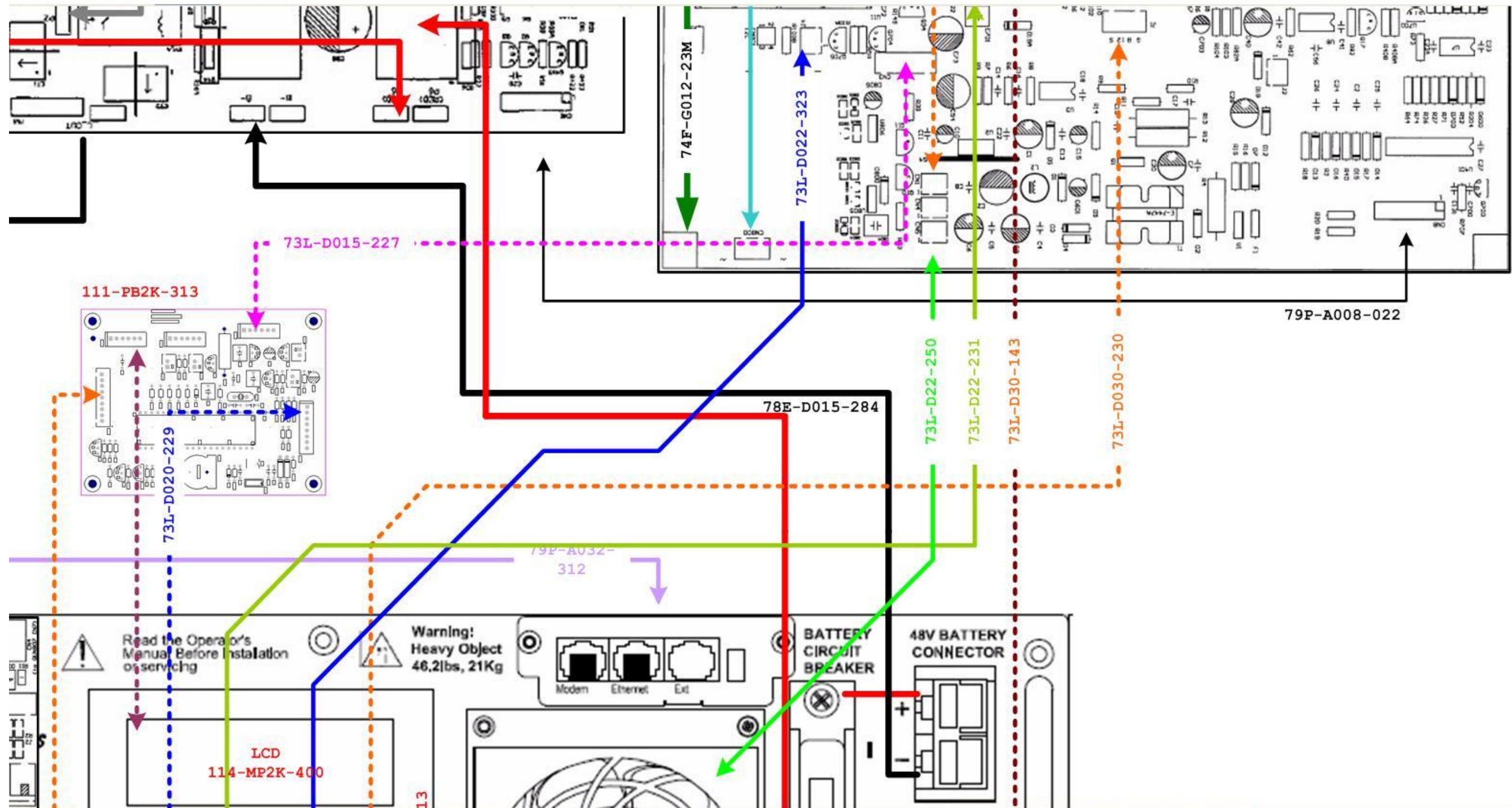




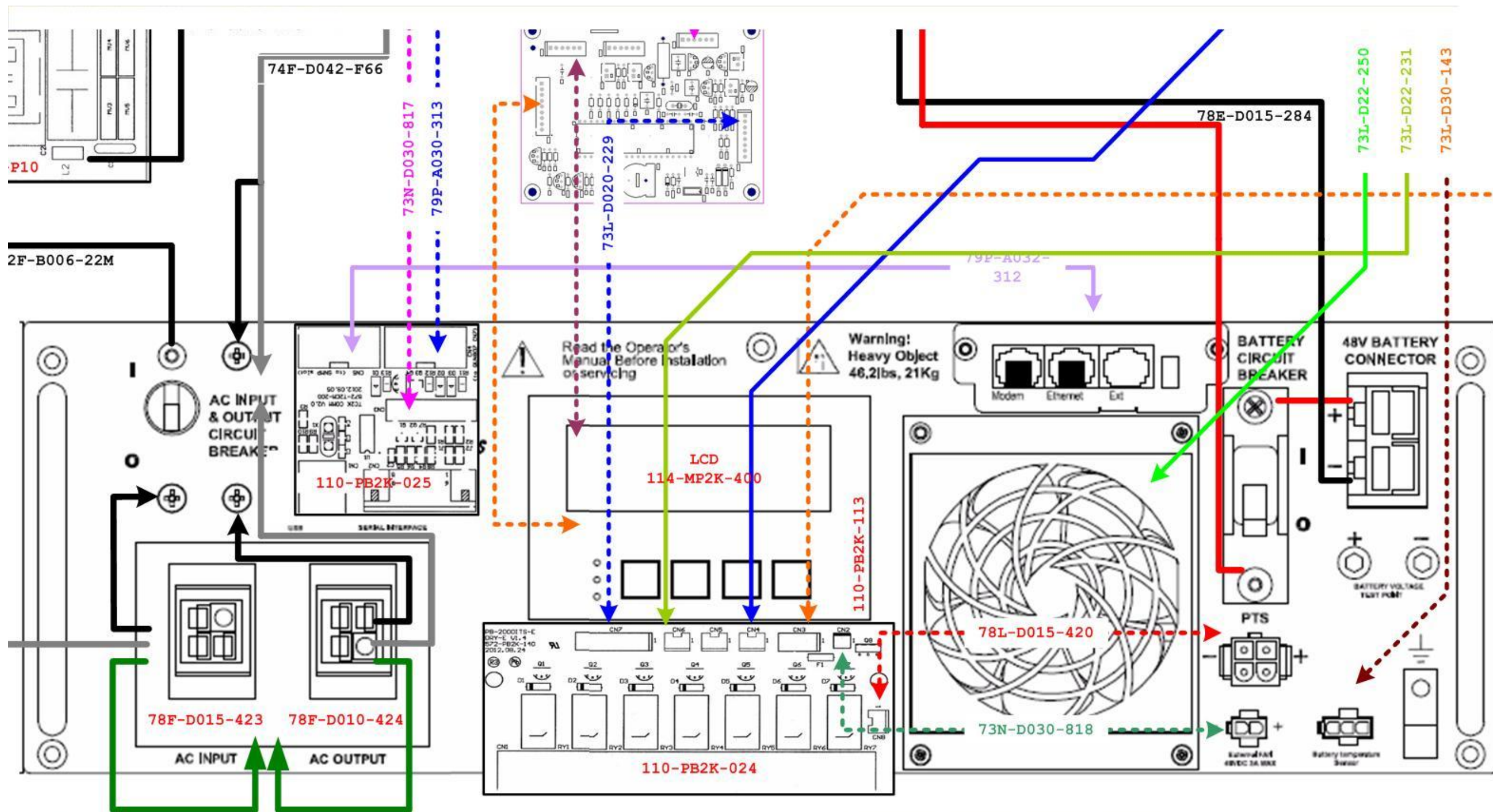


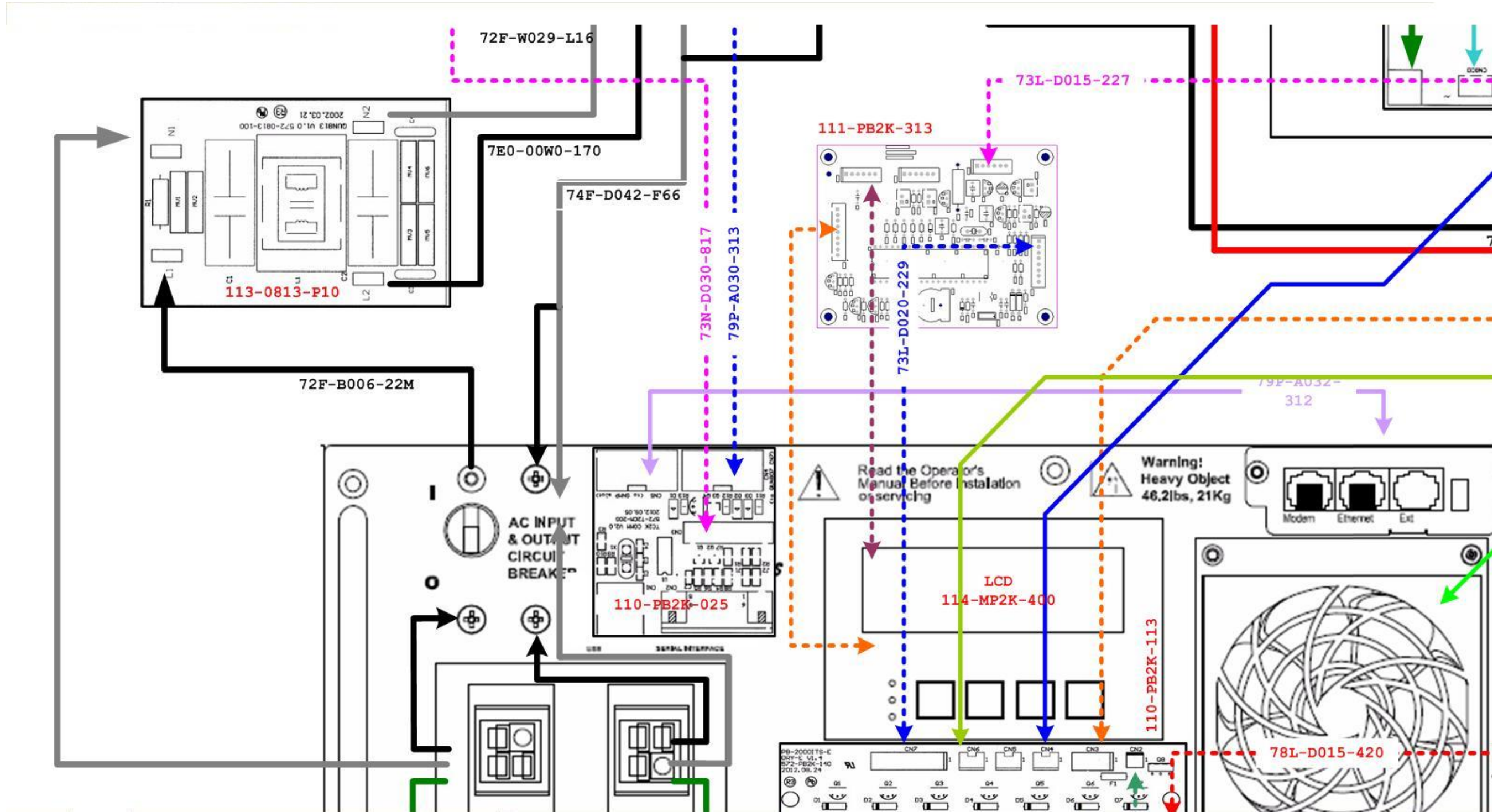






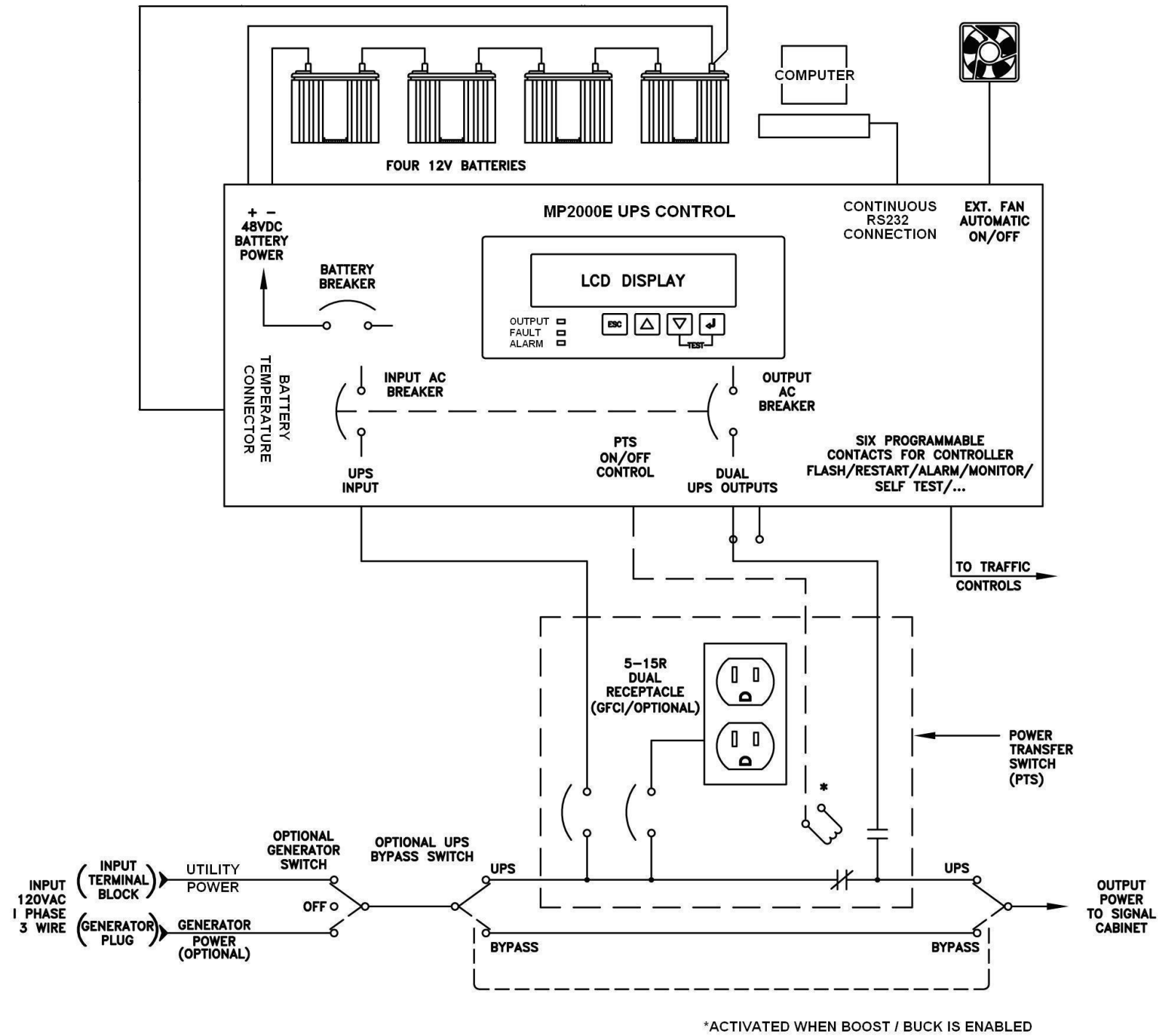








**Simplified System Block Diagram**  
**MP SERIES™ Battery Backup System for Traffic Signals: MP2000E System**



## **Section 10 Schematic & Logic Diagrams**

Located behind this page are schematic & logic diagrams and bills of materials for the Myers Emergency Power Systems MP 2000E System. These items are organized as follows:

- **MP 2000E System Bill of Materials**
- **Power Board & Control Board Schematic**
- **Power Board & Control Board Bill of Materials**
- **LCD Control PCB Schematic**
- **LCD Control Board Bill of Materials**
- **Relay PCB Schematic**
- **Relay Bill of Materials**
- **RS232 Schematic**
- **RS232 Bill of Materials**
- **VAC Filter Schematic**
- **VAC Filter Bill of Materials**



**MP 2000E System Bill of Materials**

<b>PBM-2K00-5X0-3794N</b>			
<b>PART NUMBER</b>	<b>DESCRIPTION</b>	<b>QTY</b>	<b>REMARK</b>
110-PB2K-024-00N	PCB PB-2000-E Dry CONTACT BOARD V1.4	1.0 EA	
110-PB2K-025-00N	PCB PB-2K,COMM V2.3	1.0 EA	RS232/USB
110-PB2K-113-00R	PCB PB-2000 MEMBRANE SWITCH(4 Line LCD)V1.0	1.0 EA	
111-PB2K-313-00N	PCB PB-2K 4L-LCD CONTROL BOARD V1.1	1.0 EA	FOR YELLOW-GREEN LCD MODEL
111-PB2K-530-00N	PCB PB-2000-V3.0 , 120V CONTROL BOARD V1.0	1.0 EA	UPS CONTROL BOARD
112-PB2K-520-00N	PCB PB-2000-V2.0, 120V POWER BOARD (Ethernet) V1.3	1.0 EA	UPS POWER STAGE BOARD
113-0813-P10-00N	PCB QUN-813P,PB2K,120V V1.0	1.0 EA	I/P EMI BOARD
114-MP2K-400-00R	PCB PB-2K 4L-LCD WH2004A-YYH-JT (YG LCD, INCLUDE HEATER)	1.0 EA	FOR YELLOW-GREEN LCD MODEL
12A-MYP2-140-00R	FIRMWARE MyP2K UPS 1X0 V4.0 CKS:646A	1.0 EA	
12A-MYPL-140-00R	FIRMWARE MyP2K LCD 1X0 V4.0 CKS:DF64	1.0 EA	
DPB-0103-B84-00R	NTC 10KΩ 60mm NTSA0103JZB84	1.0 EA	BATT TEMP SENSOT
537-IEG6-600-00R	CIRCUIT BREAKER IEG66-1REC5-61-30.0-A-01-V 30A/2P	1.0 EA	AC I/P & O/P CIRCUIT BREAKER
538-IELK-600-00R	CIRCUIT BREAKER IELK1-1-52-60.0-01-V DC60A/1P	1.0 EA	DC BATTERY CIRCUIT BREAKER
549-0000-004-00R	GROUNDING CONNECTOR CXS35-36-C (PBM)	1.0 EA	
549-0000-005-00N	TEST TERMINAL EFJ#105-0802-001,RED	1.0 EA	BATT VOLTAGE TEST POINT(+)
549-0000-006-00N	TEST TERMINAL EFJ#105-0803-001,BLACK	1.0 EA	BATT VOLTAGE TEST POINT(+)
561-2803-450-00R	DC FAN FD128025EB-N 12V 8CM(PBM)	1.0 EA	
563-0008-CM2-00R	FAN FILTER(THREE IN ONE) 8cm (PBM)	1.0 EA	
614-0000-044-00R	PC BOARD GUIDE GROOVE CG-9F	2.0 EA	



MP SERIES™ Battery Backup System for Traffic Signals: MP2000E System

**PBM-2K00-5X0-3794N**

<b>PART NUMBER</b>	<b>DESCRIPTION</b>	<b>QTY</b>	<b>REMARK</b>
619-0000-146-00R	75A CONNECTOR HOLDER 75LOKSTMBLU	2.0 EA	
63P-B2K0-001-00R	PB-2000 TERMINAL BLOCK STICKER(LCD)	1.0 EA	
63P-B2K0-023-00R	Stickers MP2000E,120V(MYERS)	3.0 EA	
63P-B2K0-056-00R	Stickers MP2000E,120V,P/N:G30219CA2(MYERS)	1.0 EA	
63P-B2K0-057-00R	Stickers(Left) MP2000E,120V,P/N:G30219CA2	1.0 EA	
63P-B2K0-058-00R	Stickers(Right) MP2000E,120V,P/N:G30219CA2	1.0 EA	
63P-B2K0-059-00R	Stickers P/N:G30219CA2 P/N:G30222CA2(MYEARS)	1.0 EA	
641-2508-421-00R	SCREW M2.5X8 (SW)	3.0 EA	
641-3005-522-00N	SCREW M3*5 BLACK	4.0 EA	
641-3006-125-00R	SCREW M3* 6 (SW) (PCB)	10.0 EA	
641-3006-922-00R	SCREW M3*6 (BLACK)	8.0 EA	
641-3010-625-00R	SCREW M3*10 AND SPRING WASHERS ASSEMBLED	2.0 EA	
641-3015-523-00R	SCREW M3*15 Ni PCB	4.0 EA	
641-3275-900-00R	ALUMINUM RIVET 3.2*7.5	4.0 EA	
641-3410-530-00R	SCREW ⊕6-32T*10(STAINLESS STEEL ) (PBM)	2.0 EA	
641-3520-921-00R	SCREW P⊕3.5*20+S+W	4.0 EA	
641-4006-321-00R	SCREW M4*6	1.0 EA	
641-4006-423-00R	SCREW M4*6	4.0 EA	
641-4006-520-00R	SCREW M4*6(BLACK)	13.0 EA	
641-4011-431-00R	SCREW 8#-32-3/8L SUS (STAINLESS STEEL )	4.0 EA	
641-5012-320-00R	SCREW P⊕5*12 5φINTERNAL TEETH WASHER ASSEMBLED	1.0 EA	
642-0000-405-00N	NUT 4mm	3.0 EA	
642-0000-500-00R	NUT M5	4.0 EA	
643-0000-021-00R	WASHER W4.2*10*0.8	4.0 EA	
644-0000-004-00R	SPRING WASHER 4mm	4.0 EA	
649-0000-032-00R	EMI CORE L52T 25*15*12 PBM	1.0 EA	LCD CONTROL BOARD CN3
649-6060-001-00R	HEXANGULAR IRON PILLAR 6*60+M4*6	4.0 EA	





MP SERIES™ Battery Backup System for Traffic Signals: MP2000E System

**PBM-2K00-5X0-3794N**

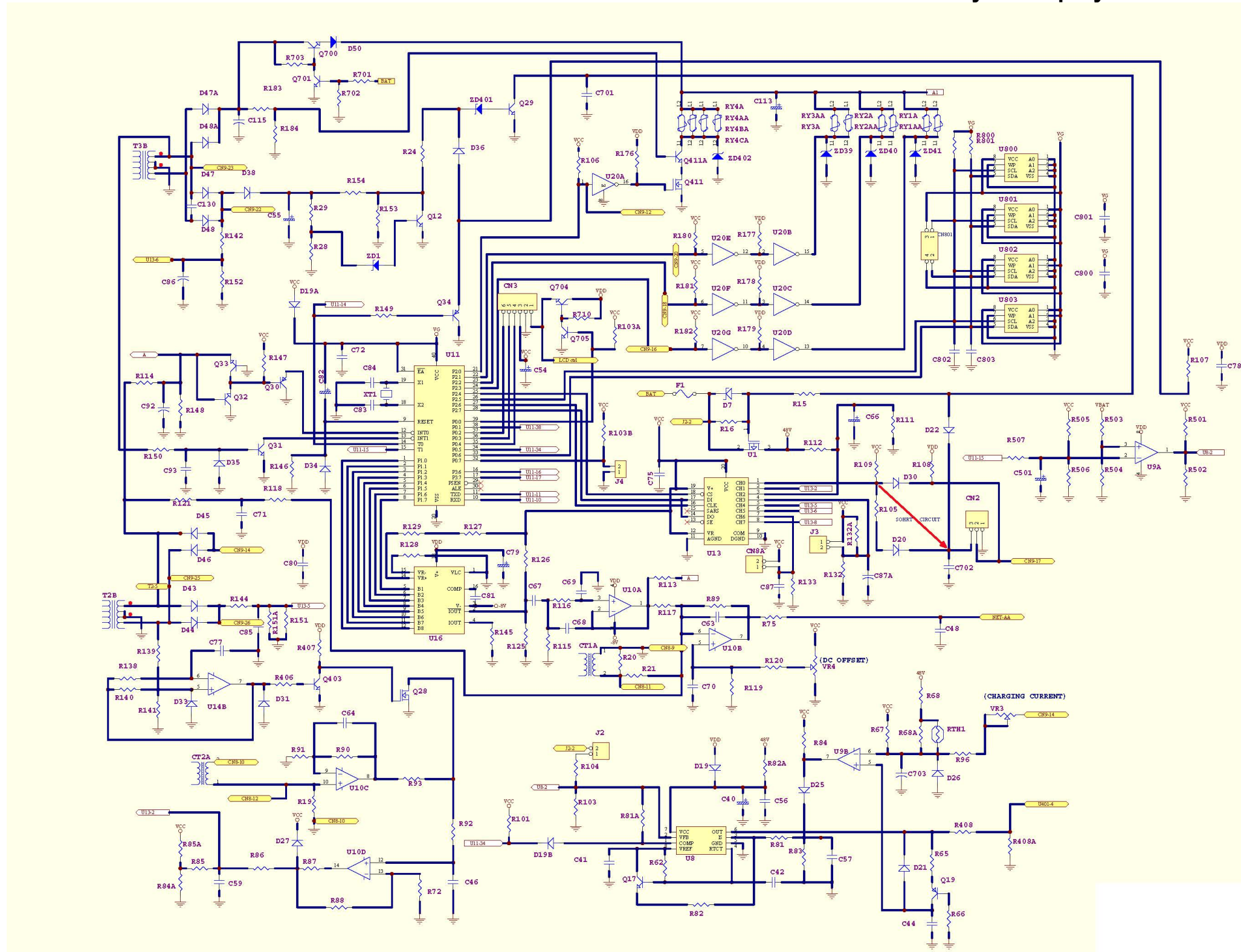
<b>PART NUMBER</b>	<b>DESCRIPTION</b>	<b>QTY</b>	<b>REMARK</b>
651-0170-800-00R	RUBBER PAD 170 * 80 * 3T	1.0 EA	
653-SNMP-021-00R	PBM-2K SNMP Spacer R2	1.0 EA	
659-0000-035-00R	Spacer 80 * 127.5 * 0.38T (PBM)	1.0 EA	
72F-B006-22M-00R	WIRE 22M 12# BLACK 60mm(PB-2000ITS)	1.0 EA	
72F-G012-23M-00R	WIRE 23M 12# GREEN 120mm(PB-2000ITS)	1.0 EA	
72F-W029-L16-00R	WIRE L16 12# WHITE 290mm(AZ-3K)	1.0 EA	
73L-D015-227-00R	WIRE 227 22# BLACK-GREEN 150mm (PBM)	1.0 EA	
73L-D020-229-00R	WIRE 229 22# BLACK-PURPLE 200mm(PBM)	1.0 EA	
73L-D022-231-00R	WIRE 231 22# GREEN-YELLOW 220mm(PBM)	1.0 EA	
73L-D022-232-00R	WIRE 232 22# PURPLE-BLUE 220mm PBM	1.0 EA	
73L-D022-250-00R	WIRE 250 22# BLACK-RED XH-2P 2P 220mm(PBM)	1.0 EA	
73L-D030-143-00R	WIRE 143 22# RED-BLACK 300mm (PBM)	1.0 EA	
73L-D030-230-00R	WIRE 230 22# BLACK-ORANGE 300mm(PBM)	1.0 EA	
73L-D300-F84-00R	WIRE F84 22# 3000mm(PBM-2K-ITS)	1.0 EA	
73M-D021-F83-00R	WIRE F83 24# 210mm(PBM-2K-ITS)	1.0 EA	
73N-D030-817-00R	WIRE 817 26# 300mm (TC2000) MALE	1.0 EA	
73N-D030-818-00R	WIRE 818 22# RED-BLACK 300mm (TC2000) FEMALE	1.0 EA	
74F-D042-F66-00R	WIRE F66 12# 420mm(PB-2000ITS)	1.0 EA	
78E-D015-284-00R	WIRE 284 10#/20# RED-BLACK 150mm (TC2000)	1.0 EA	
78F-D010-424-00R	WIRE 424 12# 100mm(PTS/PB-2000)	1.0 EA	
78F-D015-423-00R	WIRE 423 12# 150mm(PTS/PB-2000)	1.0 EA	
78L-D015-420-00R	WIRE 420 22# 150mm(PB-2000 PTS)	1.0 EA	
79P-A008-022-00R	WIRE 3131-16PIN * 2-8.5cm (PBM)	2.0 EA	
79P-A009-023-00R	WIRE 3131-26PIN * 2-9cm (PBM)	1.0 EA	
79P-A030-313-00R	WIRE 313 28# GRAY 300mm(PB-2000)	1.0 EA	
79P-A032-312-00R	WIRE 312 28# GRAY 320mm(PB-2000)	1.0 EA	
7E0-00W0-170-00R	WIRE EW17 BLACK	1.0 EA	
866-PBM2-K05-00R	MAIN TRANSFORMER PBM-2000-1-A EI133*100*Z11	1.0 EA	

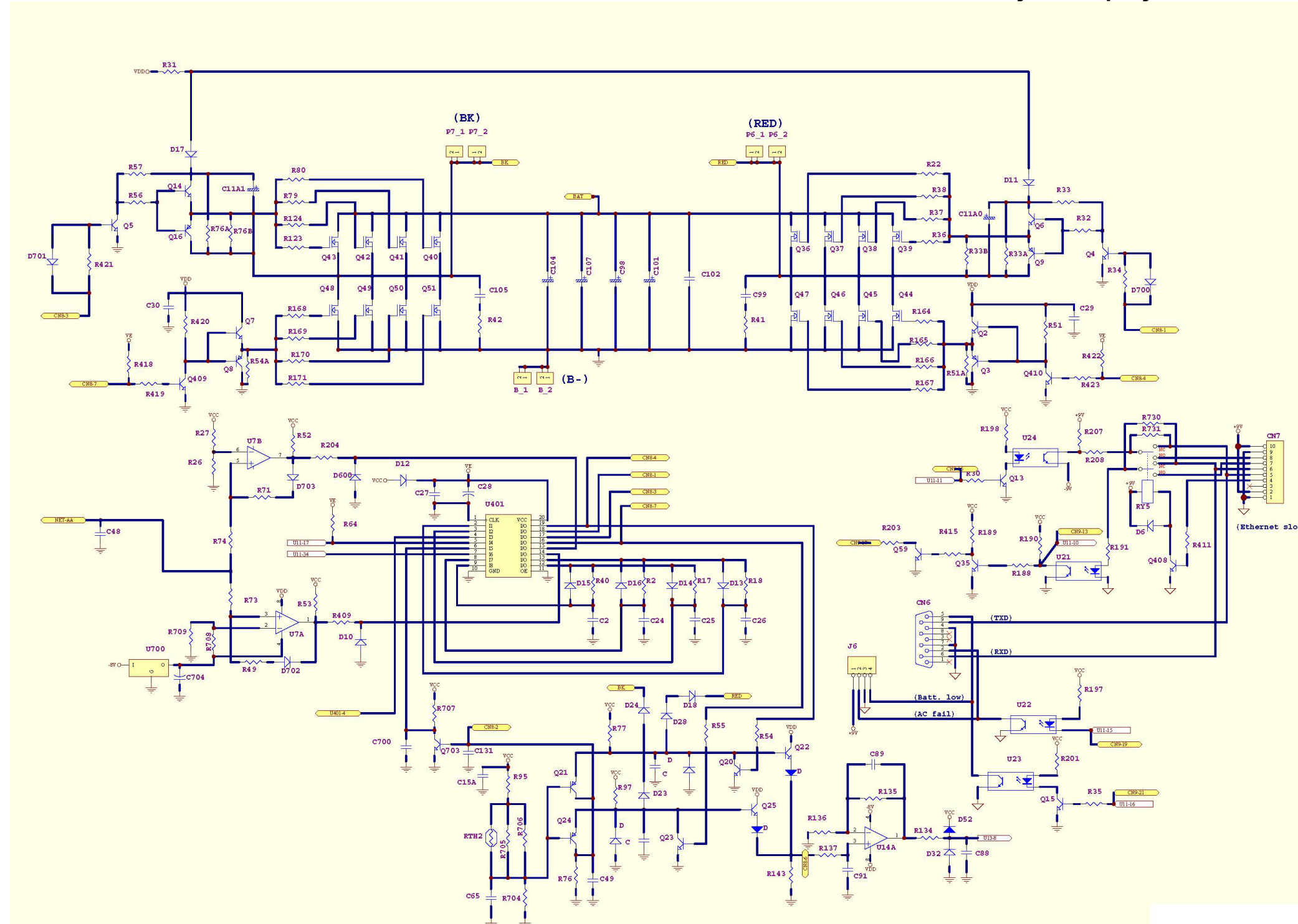


MP SERIES™ Battery Backup System for Traffic Signals: MP2000E System

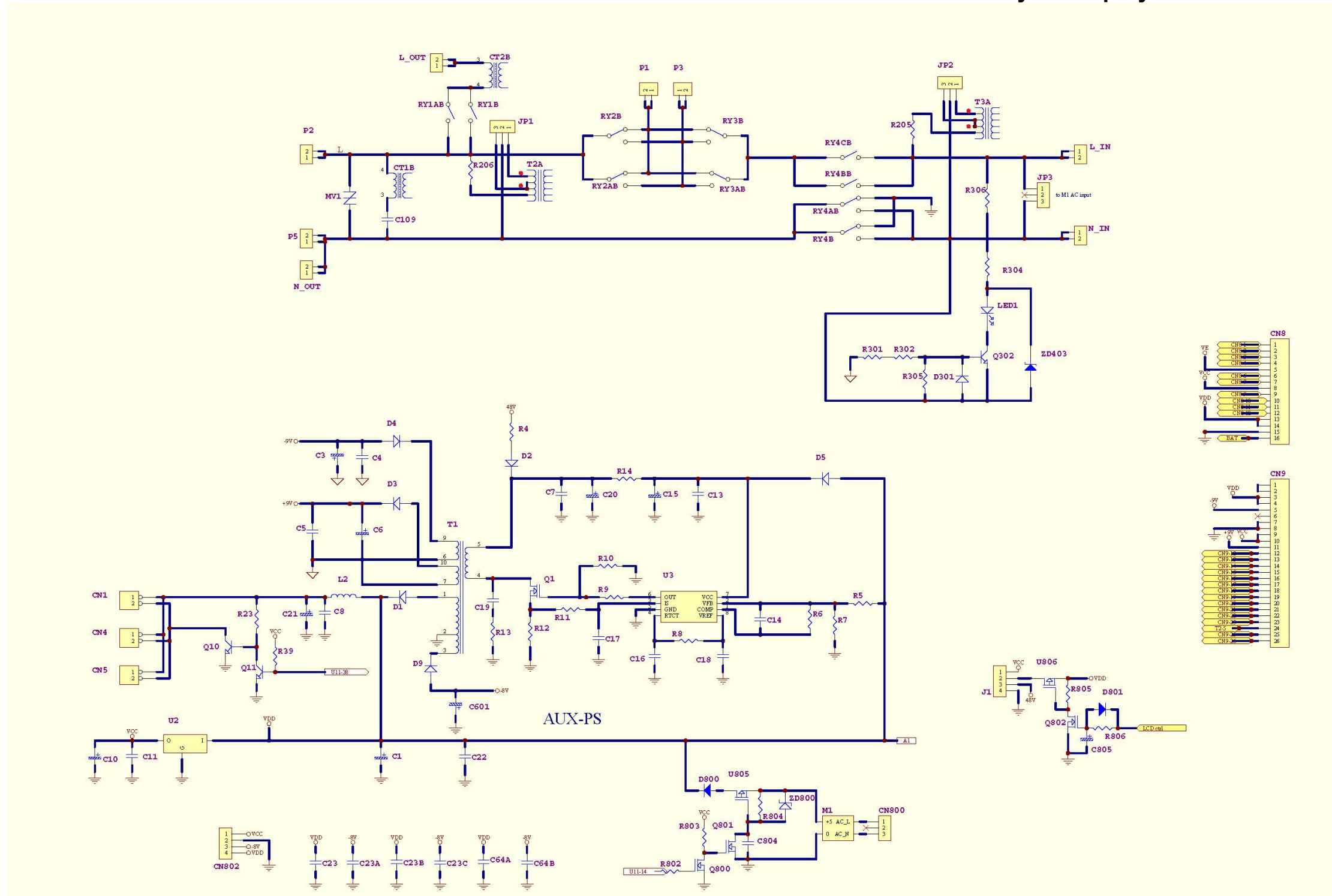
**PBM-2K00-5X0-3794N**

<b>PART NUMBER</b>	<b>DESCRIPTION</b>	<b>QTY</b>	<b>REMARK</b>
911-1220-3V1-00R	LI-BATTERY BBBCR1220 (LIXING)	1.0 EA	FOR REAL-TIME CLOCK
941-PB2K-019-00R	PB-2K FRONT PANEL MYERS (USB/SNMP/4-Line LCD)	1.0 EA	
943-PB2K-011-00R	MP-2K UPPER COVER BLACK	1.0 EA	
944-PB2K-000-00N	PB-2000 CHASSIS (LCD) R7	1.0 EA	
947-PM1K-200-00N	DC BREAKER BARRIER	1.0 EA	
947-SNMP-051-00R	PB-2K SNMP COVER R2	1.0 EA	
94A-PB2K-000-00R	PB-2000 FAN STATOR (LCD) R2	1.0 EA	
94A-PB2K-001-00R	PB-2000 EXTERNAL BATTERY STATOR (LCD) R2	1.0 EA	
94X-SR1K-505-00N	HANDLE (WITHOUT SCREW)	2.0 EA	
951-MP2K-E11-00R	MP-2000E CARTON (MYERS)	1.0 EA	
954-PB2K-000-00R	PB-2000 EPE (LCD)	2.0 EA	
957-MK80-000-00R	PLASTIC BAG 38 * 64 * 0.06	1.0 EA	











**Power Board & Control Board Bill of Materials**

<b>POWER BOARD</b>			
<b>PART NUMBER</b>	<b>DESCRIPTION</b>	<b>QTY</b>	<b>REMARK</b>
357-4710-M40-00R	Electrolytic capacitors 100UF/50V 105°C Low-ESR	3.0 EA	C113, C11A0, 11A1
357-4810-M71-00R	Electrolytic capacitors 1000UF/50V 105°C Low-ESR	1.0 EA	C115
357-7827-MA0-00R	Electrolytic capacitors 2700UF/100V 105°C	4.0 EA	C98, 101, 104, 107
421-IN41-481-00R	Diode 1N4148 0.2A100V(DO35)	7.0 EA	D11, 17, 24, 43-46
426-1N47-540-00R	Diode 1N4754A 1.3W 39V (DO41)	4.0 EA	ZD39,40,41,402
431-N222-2AT-00R	Transistor PN2222ATAR 1A40V (TO92)	10.0 EA	Q13,15,20,23,25,35,59,408,409,410
431-PN29-07T-00R	Transistor PN2907ATAR -0.8A-60V(TO92)	6.0 EA	Q3,8,9,16,21,24
434-MPSA-060-00R	Transistor MPSA06L 0.5A80V (TO92)	2.0 EA	Q4,5
438-MPSA-130-00R	TransistorMPSA13 0.5A30V (TO92)	5.0 EA	Q2,6,7,14,411A
442-2N70-000-00R	FET (Field Effect Regulator) 2N7000 0.2A60V (TO93) (FAIRCHILD)	1.0 EA	Q411
572-PB2K-100-00N	Raw PCB (POWERBoard) PB-2000 V1.1	1.0 EA	
215-4100-310-00R	Carbon Film Resistor 1W 1Kohm 5%	2.0 EA	R32,56
270-SC05-A10-00R	NTC Thermal Resistor SC05A103J9L31F61 10KΩ	1.0 EA	RTH2
270-SH24-A10-00R	NTC Thermal Resistor NTSH052JZ008	1.0 EA	HS1,2
312-7222-J50-00R	Plastic capacitance 0.0022UF/100V J-type	2.0 EA	R704-D23P,R76-R77
31X-9620-ZV0-00R	Plastic capacitance 20uF/180V(PMT1A8A20K0)	1.0 EA	C109
323-I310-KA0-00R	Ceramic capacitors 10000PF/ 1KV Y5P K-type	1.0 EA	D47-P→D48-P
414-0020-040-00R	IC ULN2004AN (TI)	1.0 EA	U20
417-T110-900-00R	Photo Coupler TCET1110 (VISHAY)	4.0 EA	U21-24
421-0SB1-400-00R	Zener Diode SB140 1A40V (DO41)	4.0 EA	(P)R704→(K)D23P,(P)R76→(K)R77,D700,701
421-IN40-075-00R	Diode 1N4007 1A1000V (DO41)	3.0 EA	D6,47,48
421-UF10-030-00R	Diode UF1003 1A200V (DO41)	5.0 EA	Q22D18,28,47A,48A
431-N222-2AT-00R	Transistor PN2222ATAR 1A40V (TO92)	1.0 EA	Q22



MP SERIES™ Battery Backup System for Traffic Signals: MP2000E System

<b>POWER BOARD</b>			
<b>PART NUMBER</b>	<b>DESCRIPTION</b>	<b>QTY</b>	<b>REMARK</b>
442-P120-N10-00R	FET (Field Effect Regulator) STP120NF10 120A100V (TO220) (ST)	16.0 EA	Q36-51
512-0793-P12-00R	Relay 793-P-1C 12VDC	3.0 EA	RY2A,3A,4
512-0793-P1A-00R	Relay 793-P-1A 12VDC	2.0 EA	RY1A,4C
512-206T-BU0-00R	RelayGS-SH-206TBU Coil:6V	1.0 EA	RY5
542-4S25-0A0-00R	Terminal PCRS250A	15.0 EA	P1,2,3,5,6,6,7,7,B-,B-,L-OUT,N-OUT,L-IN; N-IN,RY4A
544-1000-200-00R	Connector (JST) 2.5/3PIN	1.0 EA	RTH2
544-1000-4P0-00R	Connector JST(XH) 2.5/4PIN	1.0 EA	RY4B and RY4A
544-2001-0E1-00R	Connector 10PIN(5x2)	1.0 EA	CN7
544-2001-6E1-00R	Connector 16PIN(8x2)	1.0 EA	CN8
544-2102-6A0-00R	Connector 26PIN(13x2)	1.0 EA	CN9
544-7000-900-00N	Connector DB 9PIN	1.0 EA	CN6
561-2551-600-00R	DC Fan 50x50x10mm DFB501012H 12V 6000RPM	1.0 EA	FAN
593-0000-002-00R	Jumper Wire 0.6 $\phi$ *52	2.0 EA	JP1(110),2(2-3)
595-20D1-510-00R	MOV D6511Z0V151RA20(150V)	1.0 EA	MV1
611-0000-022-00R	Plastic Washer WS3-8	2.0 EA	Riveting &FAN
619-0000-124-00R	Plastic Washer7 $\phi$ *3.1 $\phi$	2.0 EA	PC Board &FAN*2
619-0000-174-00R	Nylon Riveting SR3-15	2.0 EA	
641-3006-422-00R	Screw M3x6 Black	6.0 EA	HS1,2,FAN
641-3012-621-00R	Screw Hexangular M3x12Ni	16.0 EA	Q36-51
641-6010-411-00R	Screw P $\oplus$ 6#/32Tx11	3.0 EA	HS1*1,HS2*2
650-0000-TC1-00R	Transistor Cover TC-1	8.0 EA	Q44-51
651-0114-230-00R	Silicon Rubber Band 114x23x0.25T	1.0 EA	HS2
653-MK2K-000-00R	Spacer Board PCM-11420 HS2000-1 20x114	2.0 EA	HS1,2
659-0000-053-00R	Dynamic Steel EI41x35	1.0 EA	T3



MP SERIES™ Battery Backup System for Traffic Signals: MP2000E System

<b>POWER BOARD</b>			
<b>PART NUMBER</b>	<b>DESCRIPTION</b>	<b>QTY</b>	<b>REMARK</b>
659-0000-054-00R	Dynamic Steel EI35x26	1.0 EA	T2
672-H114-003-00R	Heat Sink FH-75821-114(Black)	1.0 EA	HS2
672-H114-004-00R	Heat Sink(114x51mm) 75821-114 V1.1	1.0 EA	HS1
72H-B003-24A-00R	Wire 24A 16# Black 27mm(PB2000)	1.0 EA	CT2
72J-R003-688-00R	Wire 688 18# Red 35mm (PCB)	1.0 EA	CT1
836-0369-8A0-00R	Current Trans (CT)3698A 8Ring 1:1500	1.0 EA	CT2
836-SA48-5LS-00R	Current Trans (CT) SA-486(LS)	1.0 EA	CT1
855-MH16-R20-00R	Transformer MH-16R3	1.0 EA	T2
866-PBM2-K04-00R	Low Frequency Transformer PB-2000-PT EI-41x20 Z11	1.0 EA	T3
94A-PLP0-001-00R	PL-8 L-Type Stator	2.0 EA	FAN*2
695-0000-004-00R	Silicone Conformal Coating DOW CORNING 3-1953	n/a	Part face, Sik surface

<b>CONTROL BOARD</b>			
<b>PART NUMBER</b>	<b>DESCRIPTION</b>	<b>QTY</b>	<b>REMARK</b>
112-NFM0-512-00R	Power board NFM-05-12 (Input:100~240,Output:12VDC)	1.0 EA	
213-0000-310-00R	Carbon Film Resistors 1/4W 0ohm 5%	2.0 EA	D19A,30
421-0SB1-400-00R	Schottky Diode SB140 1A/40V	2.0 EA	D12,31
421-IN40-075-00R	Diode 1N4007 1A/1000V	3.0 EA	D2,5,800
421-IN41-481-00R	Switching diode 1N4148 0.2A/100V	2.0 EA0	D10,13-16,19,19B,21,25-27,32-36,600,702,703,ZD401(inverse)
421-UF10-030-00R	Ultra fast switching diode UF1003 1A/200V	3.0 EA	D3,4,9
423-SR24-000-00R	Schottky Diode SR240PT 2A/40V	1.0 EA	D1
426-0018-002-00R	Zener diode HZ18-2 1/2W 17.9V	2.0 EA	D7,ZD800
431-N222-2AT-00R	Transistor PN2222ATA 1A/40V	8.0 EA	Q11,17,31-33,403,703,705
431-PN29-07T-00R	Transistor PN2907ATAR -0.8A/60V	3.0 EA	Q19,30,34
434-2N55-512-00R	Transistor 2N5551TA 0.6A/160V	1.0 EA	Q29
438-MPSA-130-00R	Transistor MPSA13 0.5A/30V	1.0 EA	Q704





MP SERIES™ Battery Backup System for Traffic Signals: MP2000E System

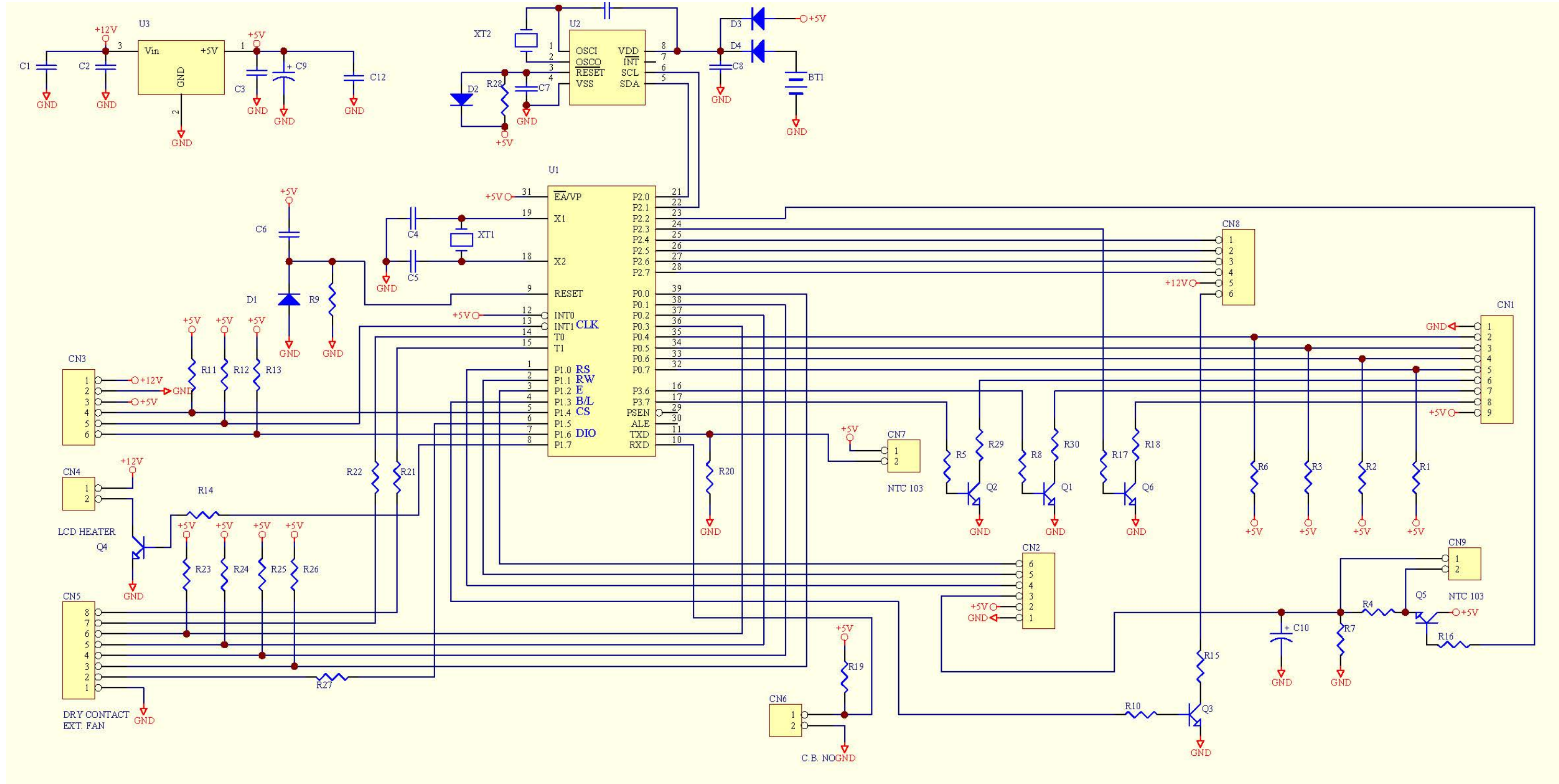
**CONTROL BOARD**

<b>PART NUMBER</b>	<b>DESCRIPTION</b>	<b>QTY</b>	<b>REMARK</b>
442-2N70-000-00R	MOSFET 2N7000TA 0.2A/60V	1.0 EA	Q28
236-0220-310-00R	Metal Oxide Resistors 2W/0.22ohm 5%	1.0 EA	R12
236-1100-310-00R	Metal Oxide Resistors 2W/1ohm 5%	1.0 EA	R4
236-2470-310-00R	Metal Oxide Resistors 2W/47ohm 5%	1.0 EA	R13
260-5100-01A-00R	Variable resistor 25-turn 3296W-1-103 10Kohm 10%	1.0 EA	VR3
260-6100-01B-00R	Variable resistor 25-turn 3296W-1-104 100Kohm 10%	1.0 EA	VR4
270-103C-000-00R	NTC resistance NK103C1R5	1.0 EA	RTH1
312-7268-J50-00R	Plastic capacitance 0.0068UF/100V J-type	1.0 EA	C131
411-5964-C00-00R	Microprocessor SM5964C40PP 8051MCU, ISP (Syncomos)	1.0 EA	
414-1039-300-00R	Integrated circuit BA10393	2.0 EA	U7,9
414-AC08-00L-00R	Integrated circuit DAC0800LCN	1.0 EA	U16
414-DC08-380-00R	Integrated circuit ADC0838CCN	1.0 EA	U13
414-TL08-401-00R	Integrated circuit TL084IN	1.0 EA	U10
415-2842-001-00R	Integrated circuit TL2842P	1.0 EA	U8
415-2843-000-00R	Integrated circuit UC 2843BNG	1.0 EA	U3
417-0TL0-721-00R	Integrated circuit TL072CP	1.0 EA	U14
419-ATF1-6V0-00R	Integrated circuit PLD ATF16V8BQL-15PU	1.0 EA	U401
441-9540-N00-00R	MOSFET IRF9540N -23A/100V	3.0 EA	U1,805,806
442-IRF6-304-00R	MOSFET IRF630 9A/200V	1.0 EA	Q1
442-P36N-030-00R	MOSFET PHP36N03LT 43.4A/30V	1.0 EA	Q10
472-0078-05H-00R	Positive Voltage regulators PS7805A 5V/1A (4.975V~5.025V)	1.0 EA	U2
472-079L-050-00R	Negative Voltage regulators MC79L05ACP (ON)	1.0 EA	U700
524-0030-001-00R	Resistance Fuse 3A/125V	1.0 EA	F1
544-1000-200-00R	Connector JST 2.5/2PIN	7.0 EA	J3, 4, CN1, CN2 (inverse), CN4, CN5, CN8A
544-1000-301-00R	Connector 2.5/3PIN 180 degree	1.0 EA	CN800
544-1000-400-00R	Connector JST 2.5/4PIN	1.0 EA	J1



MP SERIES™ Battery Backup System for Traffic Signals: MP2000E System

<b>CONTROL BOARD</b>			
<b>PART NUMBER</b>	<b>DESCRIPTION</b>	<b>QTY</b>	<b>REMARK</b>
544-1000-600-00R	Connector 2.5/6PIN	1.0 EA	CN3
544-2001-6E1-00R	Connector 16PIN(8*2) 180 degree	1.0 EA	CN8
544-2102-6A0-00R	Connector 26PIN(13*2) 180 degree	1.0 EA	CN9
544-5000-201-00R	Connector 2200/2PIN(2*2)	1.0 EA	CN801
548-1004-000-00R	IC socket 40PIN	1.0 EA	U11
592-011M-HZ4-00R	Crystal Oscillator 11.0592MHZ±30PPM 20PF	1.0 EA	XT1
593-0000-002-00R	Jumper 0.6*52	3.0 EA	JP1-3
641-3008-821-00R	Screw M3X8 Ni/Round	1.0 EA	U2
642-0000-035-00R	Nnt 3*6*2.6T	1.0 EA	U2
650-0000-QW1-00R	Insulation sheet QW1	1.0 EA	XT1
674-FALH-100-00R	Heat sink 22.4*37 fishbone type	1.0 EA	U2
695-0000-004-00R	Silicone Conformal Coating DOW CORNING 3-1953	n/a	Part face,Sik surface
815-0032-050-00R	Choke RC0816T-501K	1.0 EA	L2
855-LS74-470-00R	Transformer LS-7447A	1.0 EA	T1

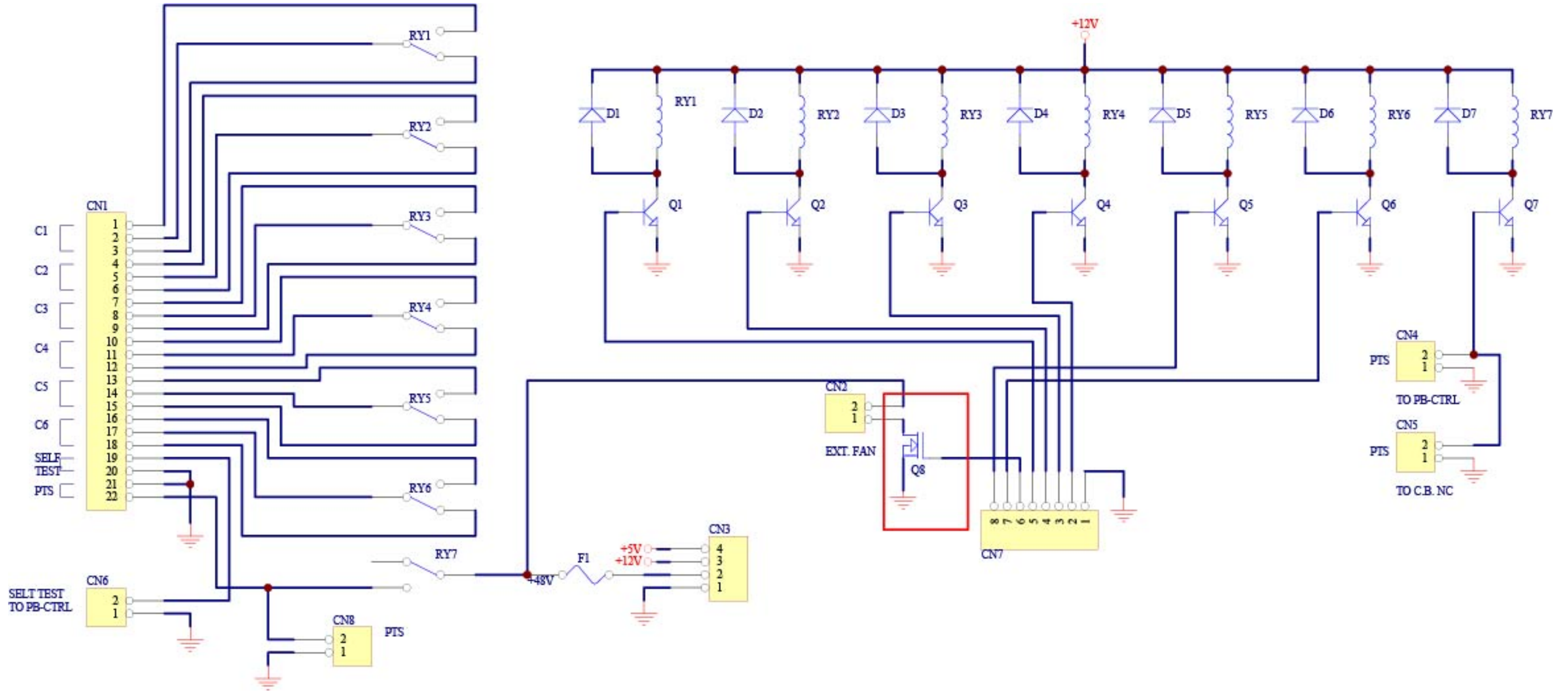




### LCD Control Board Bill of Materials

LCD CONTROL BOARD			
PART NUMBER	DESCRIPTION	QTY	LOCATION
412-8593-000-00R	IC RTC PCF8593T/1(SO8) (PHILLIPS)	1.0 EA	U2
592-032K-HZ0-00R	Crystal OSC 32.768KHz±20PPM	1.0 EA	XT2
572-PB2K-131-00N	PC Board PB-2000 LCD Control V1.3	1.0 EA	
421-0SB1-400-00R	Diode SB140 1A40V (DO41)	2.0 EA	D3,4
421-IN41-481-00R	Diode 1N4148 0.2A100V(DO35)	2.0 EA	D1,2
438-BTNA-140-00R	Transistor BTNA14A3 0.5A60V (TO-92)	6.0 EA	Q1-6
236-3100-310-00R	Resistors 2W 100 ohm 5%	1.0 EA	R15
270-103C-000-00R	NTC Thermal Resistor NK103C1R5	2.0 EA	CN7,9
411-8958-A00-00R	CPU SM8958AC25P(SYNCMOS)	1.0 EA	U1
472-C78L-051-00R	IC MC78L05ACPRPG (TO92)(ON)	1.0 EA	U3
544-1000-200-00R	Connector (JST) 2.5/2PIN	1.0 EA	CN4
544-1000-600-00R	Connector 2.5/6PIN	1.0 EA	CN3
544-1100-8A0-00R	Connector 2.5/8PIN	1.0 EA	CN5
544-5100-900-00R	Connector 11009GR060BS140	1.0 EA	CN1
544-5101-605-00R	Connector 1100*16PIN	1.0 EA	CN2,8
548-1004-000-00R	IC Socket 40PIN	1.0 EA	U1
592-011M-HZ4-00R	Crystal OSC 11.0592MHZ±30PPM 20PF	1.0 EA	XT1
593-0000-002-00R	Jumper Wire 0.6φ * 52	1.0 EA	CN6
619-0000-144-00R	Battery Holder BHB6810AP2L(LOTES)	1.0 EA	BT1
650-0000-QW1-00R	Spacer QW1	1.0 EA	XT1
695-0000-004-00R	Silicone Conformal Coating DOW CORNING 3-1953	n/a	Part face, Sik surface

**Relay Schematic**  
**MP SERIES™ Battery Backup System for Traffic Signals: MP2000E System**

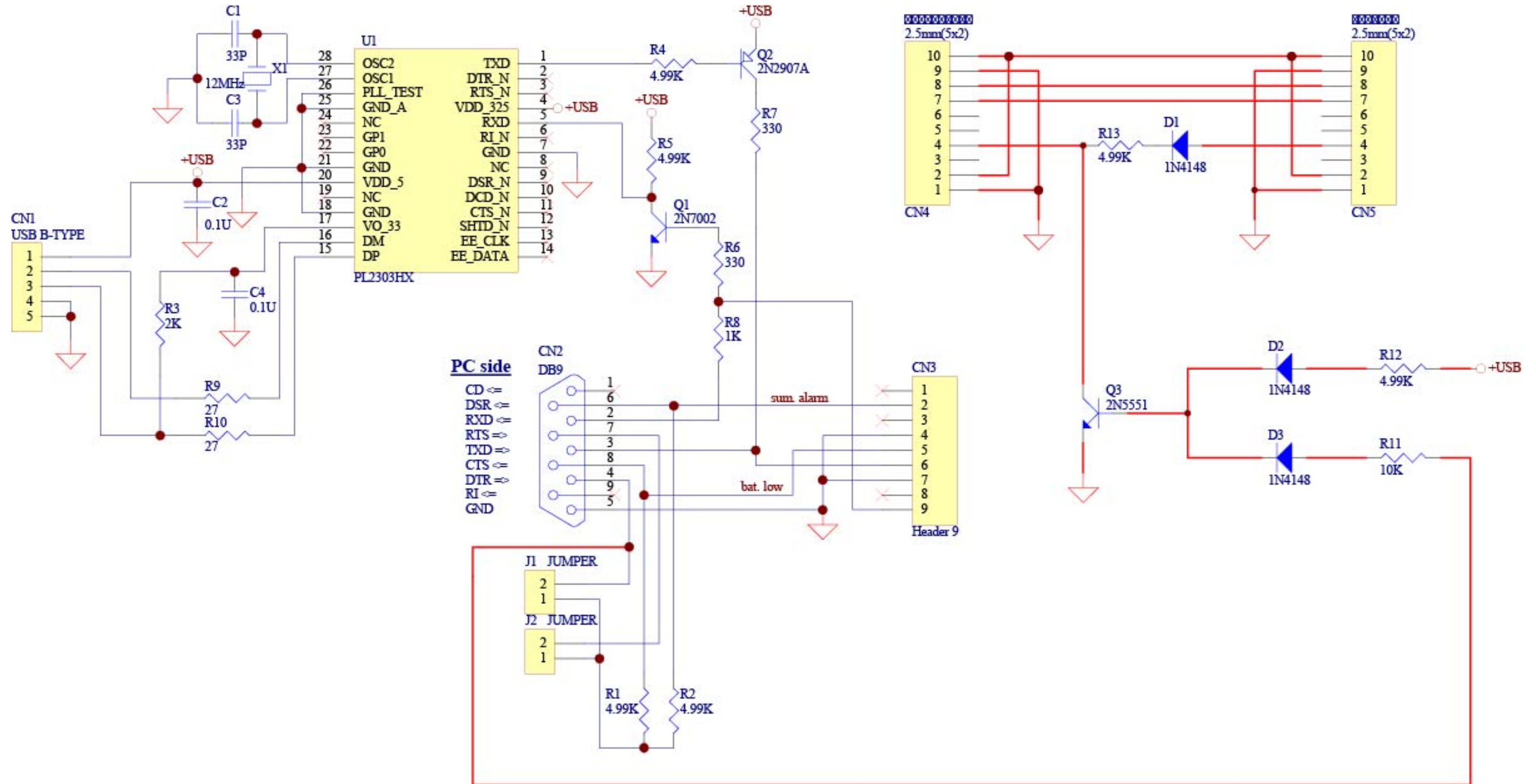






## Relay Bill of Materials

<b>RELAY</b>			
<b>PART NUMBER</b>	<b>DESCRIPTION</b>	<b>QTY</b>	<b>LOCATION</b>
421-IN41-481-00R	Diode 1N4148 0.2A100V (DO36)	7.0 EA	D1~7
438-MPSA-130-00R	Transistor MPSA13 0.5A30V (TO93)	7.0 EA	Q1~7
442-IRF3-710-00R	FET (Field Effect Regulator) IRF3710 57A100V (TO220)	1.0 EA	Q8
512-LJ12-000-00R	Relay LJ-12 (SPDT 12VDC)	7.0 EA	RY1~7
524-0030-001-00R	Fuse Resistance 3A/125V	1.0 EA	F1
543-0026-220-00R	Terminal Table DT-123RA 22PIN	1.0 EA	CN1
544-1000-200-00R	Connector 2.5/2PIN	3.0 EA	CN4, 6, 8
544-1000-400-00R	Connector 2.5/4PIN	1.0 EA	CN3
544-1000-800-00R	Connector 2.5/8PIN	1.0 EA	CN7
544-2000-2E0-00R	Connector WAFER Mx 2.54/2PIN	1.0 EA	CN2
572-PB2K-140-00N	Raw PCB (Dry Contact) PB2000-E V1.4	1.0 EA	



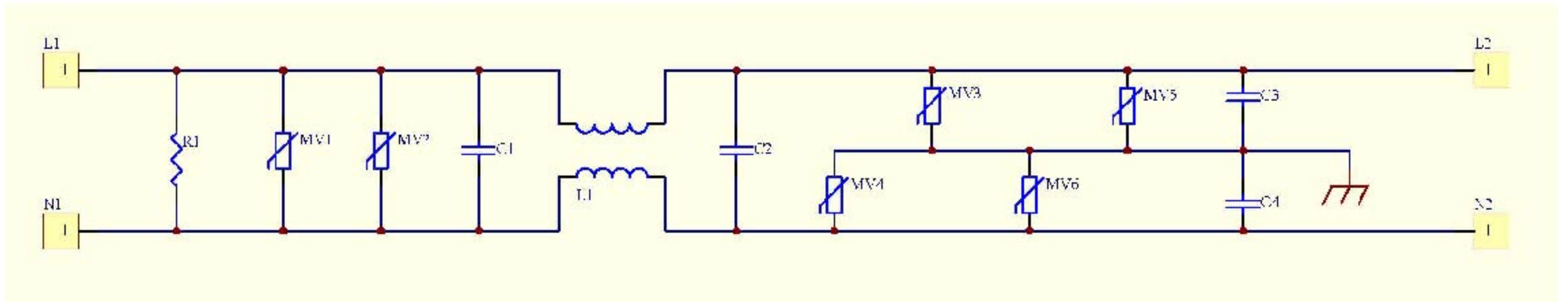


**RS232 Bill of Materials**

<b>RS232 COMMUNICATION BOARD</b>			
<b>PART NUMBER</b>	<b>DESCRIPTION</b>	<b>QTY</b>	<b>LOCATION</b>
4B1-LL41-480-00R	SMD Diode (LL-34D) LL4148	3.0 EA	D1,2,3
4C1-T290-7A0-00R	SMD Transistor (SOT-23B) SST2907A	1.0 EA	Q2
4D2-2N70-020-00R	SMD FET (Field Effect Regulator) 2N7002 (SOT-23)	1.0 EA	Q1
4N6-2303-HX0-00R	SMD IC PL-2303TA (SSOP-28) Prolific	1.0 EA	U1
4PB-T555-1G0-00R	SMD Transistor UTC MMBT5551G NPN (SOT-23)	1.0 EA	Q3
572-T2CM-200-00N	Raw PCB TC2K, COMM V2.0	1.0 EA	
544-1000-900-00R	Connector 2.5/9PIN	1.0 EA	CN3
544-2001-0E1-00R	Connector 10PIN (5X2)	2.0 EA	CN4,5
544-7000-900-00N	Connector DB-9PIN	1.0 EA	CN2
549-0USB-B00-00R	Connector USB B Type/ Glue	1.0 EA	CN1
592-012M-HZ0-00R	Crystal OSC 12.0MHZ 30PPM 20PF	1.0 EA	X1



**VAC Filter Schematic**  
**MP SERIES™ Battery Backup System for Traffic Signals: MP2000E System**





**VAC Filter Bill of Materials**

<b>VAC FILTER</b>			
<b>PART NUMBER</b>	<b>DESCRIPTION</b>	<b>QTY</b>	<b>REMARKS</b>
542-4S25-0A0-00R	Terminal PCRS250A	4.0 EA	L1,2,N1,2
572-0813-100-00N	Raw PCB QUN813 V1.0	1.0 EA	
595-20D1-510-00R	MOV D6511Z0V151RA20(150V)	2.0 EA	MV1,2
595-20D4-710-00R	MOV DNR20D471K	4.0 EA	MV3-6
852-0108-400-00R	Inductor 10840	1.0 EA	L1
695-0000-004-00R	Silicone Conformal Coating DOW CORNING 3-1953	n/a	Part face, Sik surface

## **Section 11 Assembly Drawings**

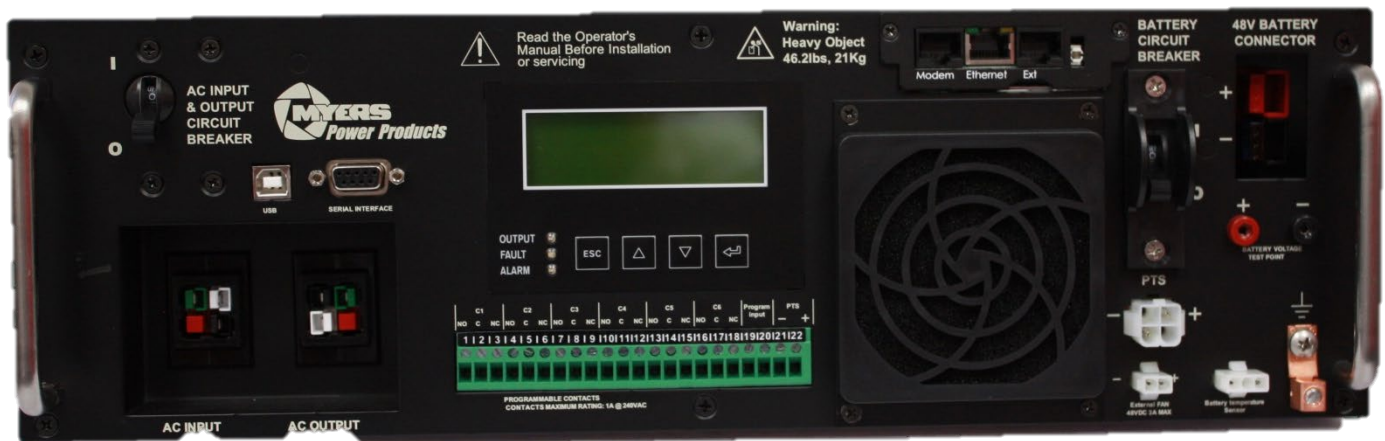
Located behind this page are assembly drawings for the Myers Emergency Power Systems MP 2000E System. These images are organized as follows:

- **Exterior Photos**
- **Interior Component Locations**
- **Interior Connections Guide**
- **Dimensional Drawing for Model 941-PB2K-054**





Front Right View



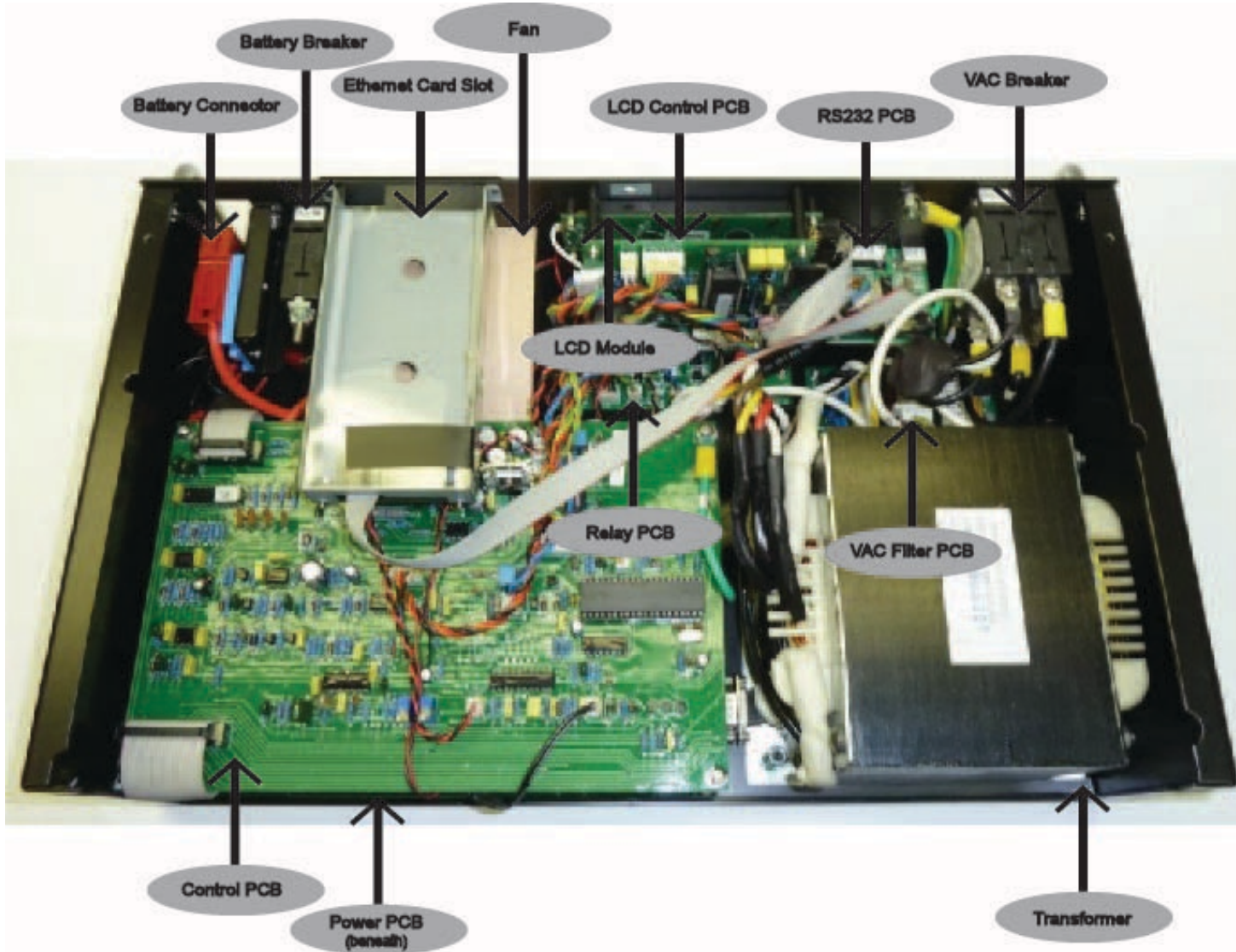
Front Panel View



**Rear Top View**



### Interior Component Locations





## Interior Connections Guide



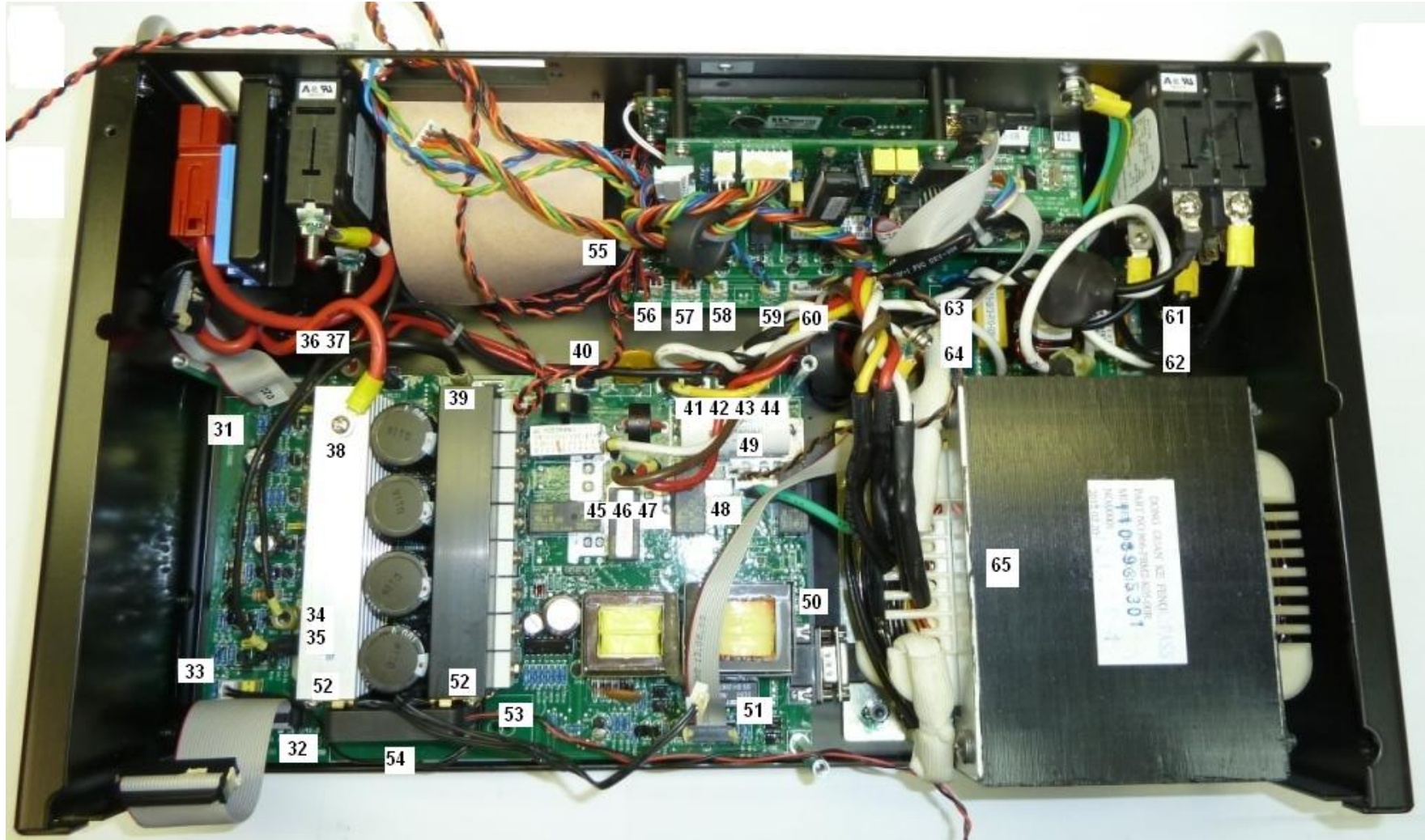
MP2000E Top Interior Connections

<b>Top Interior Connections Legend</b>		
<b>Connection Number</b>	<b>Corresponding Connection</b>	<b>Description</b>
1	31	Control PCB [CN8] to Power PCB [CN8]
2	32	Control PCB [CN9] to Power PCB [CN9]
3	n/a	Control PCB [CN4] to Front Panel Fan
4	54	Control PCB [CN1] to Power PCB Heatsink Fan
5	49	Control PCB [CN800] to Power PCB [JP3]
6	48	Control PCB Mounting Post to Power PCB [GND]
7	58	Control PCB [J4] to Relay PCB [CN4]
8	15	Control PCB [CN3] to LCD Control PCB [CN3]
9	59	Control PCB [CN2] to Relay PCB [CN6]
10	57	Control PCB [J1] to Relay PCB [CN3]
11	n/a	Control PCB [J3] to Front Panel Battery Temperature Probe Connector
12	52	Control PCB [CN8A] to Power PCB Dual Heatsink Temperature Sensor (RTH1)
13	60	LCD Control Panel PCB [CN5] to Relay PCB [CN7]
14	n/a	LCD Control Panel PCB [CN4] to LCD Module (Heater)
15	8	LCD Control PCB [CN3] to Control PCB [CN3]
16	17	LCD Control PCB [CN2] to LCD Module Ribbon Cable Header
17	16	LCD Module Ribbon Cable Header to LCD Control PCB [CN2] to
18	n/a	LCD Control Panel PCB [CN1] to Front Panel Adhesive Membrane Switch Array
19	51	RS232 PCB [CN4] to Power PCB [CN7]
20	n/a	RS232 PCB [CN5] to Ethernet Card Slot
21	50	RS232 PCB [CN3] to Power PCB [CN6]
22	n/a	Front Panel VAC Breaker (Top) VAC Input Line to Front Panel VAC Input Connector Line
23	61	Front Panel VAC Breaker (Bottom) VAC Input Line to VAC Filter PCB [L1]
24	40	Front Panel VAC Breaker (Top) VAC Output Line to Power PCB [L_Out]
25	n/a	Front Panel VAC Breaker (Bottom) VAC Output Line to Front Panel VAC Output Connector Line
26	n/a	Chassis Ground (stud) to Front Panel VAC Input Connector Ground and Front Panel VAC Output Connector Ground
27	29	Front Panel Battery Connector Positive Input to Front Panel Battery Breaker (Line)
28	39	Front Panel Battery Connector Negative Input to Power PCB [B-]

**Top Interior Connections Legend**

<b>Connection Number</b>	<b>Corresponding Connection</b>	<b>Description</b>
<b>29</b>	<b>27</b>	<b>Front Panel Battery Breaker (Line) to Front Panel Battery Connector Positive Input</b>
<b>30</b>	<b>38</b>	<b>Front Panel Battery Breaker (Load) to Power PCB Non-Anodized Heatsink</b>





Bottom Interior Connections

<b>Bottom Interior Connections Legend</b>		
<b>Connection Number</b>	<b>Corresponding Connection</b>	<b>Description</b>
31	1	Power PCB [CN8] to Control PCB [CN8]
32	2	Power PCB [CN9] to Control PCB [CN9]
33	53	Power PCB [RTH2] to Heatsink Temperature Sensor
34	65	Power PCB [P7BK] (1 of 2) to Transformer [Wire 7] (1 of 2)
35	65	Power PCB [P7BK] (2 of 2) to Transformer [Wire 7] (2 of 2)
36	65	Power PCB [P6 RED] (1 of 2) to Transformer [Wire 6] (1 of 2)
37	65	Power PCB [P6 RED] (2 of 2) to Transformer [Wire 6] (2 of 2)
38	30	Non-anodized Heatsink to Front Panel Battery Breaker (Load)
39	28	Power PCB [B-] to Front Panel Battery Connector Negative Input
40	24	Power PCB [L_OUT] to Front Panel VAC Breaker (Top) VAC Output Line
41	65	Power PCB [P5] to Transformer [Wire 5]
42	n/a	Power PCB [N_OUT] to Front Panel VAC Output Connector Neutral
43	63	Power PCB [L_IN] to VAC Filter PCB [L2]
44	64	Power PCB [N_IN] to VAC Filter PCB [N2]
45	65	Power PCB [P2] to Transformer [Wire 2]
46	65	Power PCB [P1] to Transformer [Wire 1]
47	65	Power PCB [P3] to Transformer [Wire 3]
48	6	Power PCB [GND] to Control PCB Mounting Post Screw
49	5	Power PCB [JP3] to Control PCB [CN800]
50	21	Power PCB [CN6] to RS232 PCB [CN3]
51	19	Power PCB [CN7] to RS232 PCB [CN4]
52	12	Power PCB Dual Heatsink Temperature Probe 1 of 2 to Control PCB [CN8A] (RTH1)
53	33	Power PCB Heatsink Temperature Probe to Power PCB [RTH2]
54	4	Power PCB Heatsink Fan to Control PCB [CN1]
55	n/a	Relay PCB [CN8] to Front Panel PTS Shell Connector
56	n/a	Relay PCB [CN2] to Front Panel Ext Fan Connector
57	10	Relay PCB [CN3] to Control PCB [J1]
58	32	Relay PCB [CN4] to Control PCB [J4]
59	9	Relay PCB [CN6] to Control PCB [CN2]
60	13	Relay PCB [CN7] to LCD Control PCB [CN5]



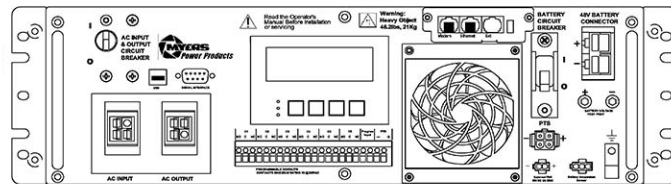
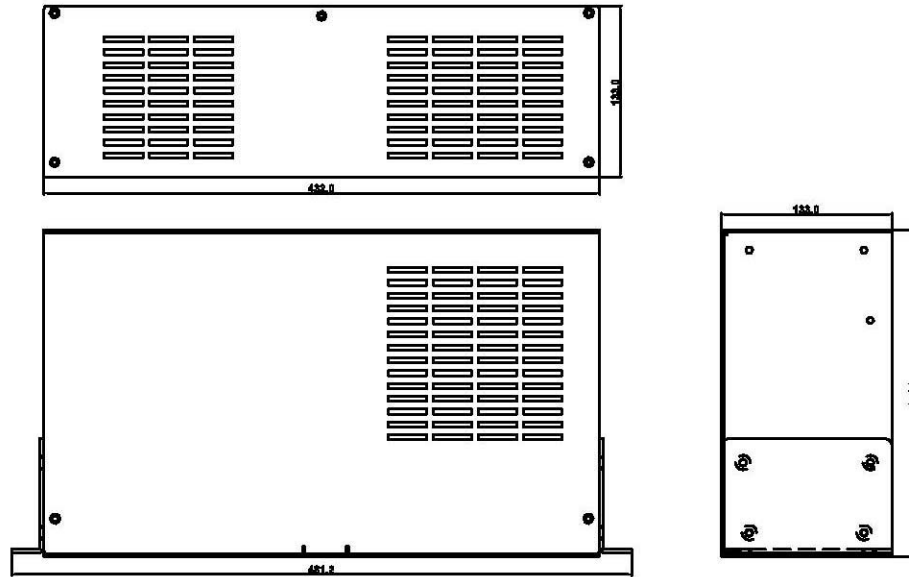
**Bottom Interior Connections Legend**

<b>Connection Number</b>	<b>Corresponding Connection</b>	<b>Description</b>
61	23	VAC Filter PCB [L1] to Front Panel VAC Breaker (Bottom) VAC Input Line
62	n/a	VAC Filter PCB [N1] to Front Panel VAC Input Connector Neutral
63	43	VAC Filter PCB [L2] to Power PCB [L_IN]
64	44	VAC Filter PCB [N2] to Power PCB [N_IN]
65	34,47 35, 36, 37, 41, 45, 46,	Transformer

**Dimensional Drawing for Model 941-PB2K-054**

**MP SERIES™ Battery Backup System for Traffic Signals: MP2000E System**

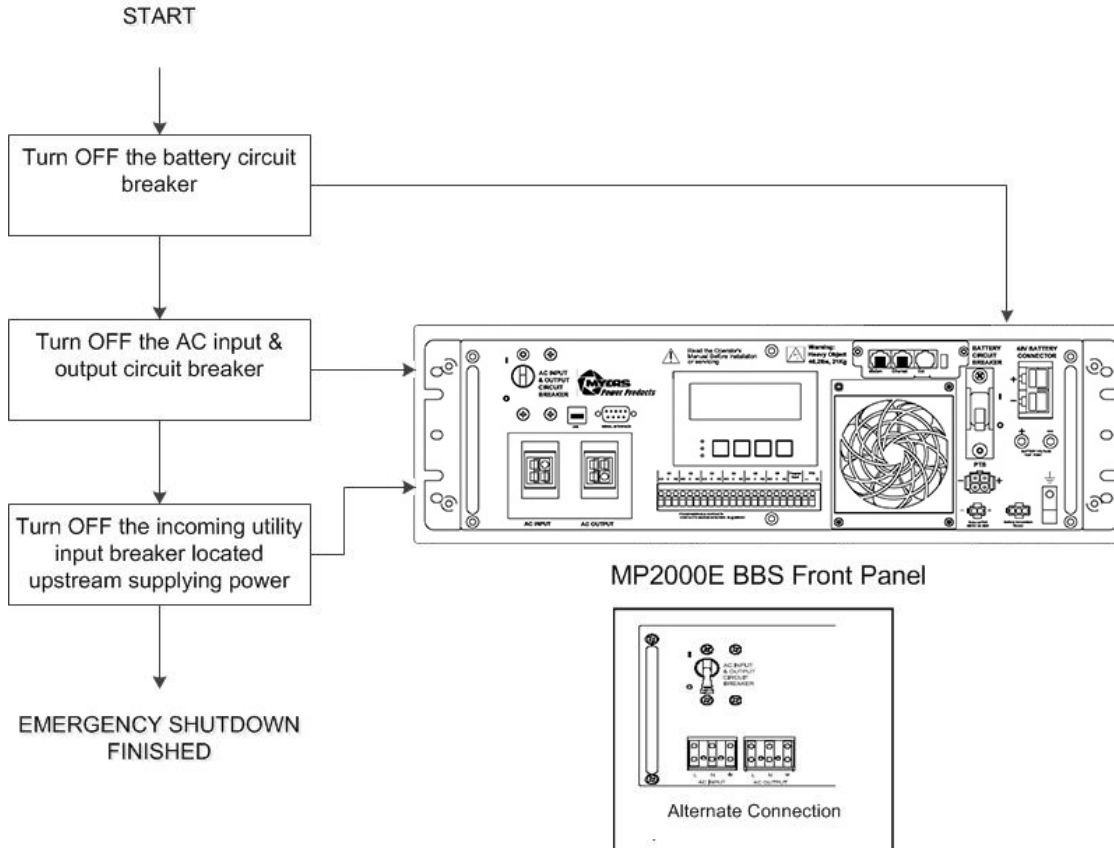
**PBM-2K00-5X0-3792N**



**941-PB2K-054**

# EMERGENCY SHUTDOWN PROCEDURE

**TURN-OFF BOTH THE AC & BATTERY BREAKER IN AN EMERGENCY.** The MP2000E BBS contains more than one live circuit. In an emergency, AC line power may be disconnected at the system's input, but output AC power may still be present from batteries.



**For service, parts, or technical support contact Myers Emergency Power Systems:**

**TEL: (610) 868-3500**

**FAX: (610) 868-8686**

[www.myerseps.com](http://www.myerseps.com)

Or scan here

